

# **PARADIGM SHIFT IN MAKING BARRIER FREE ENVIRONMENT FOR MOBILITY OF THE DISABLED PERSONS IN INDIAN CITIES WITH SPECIAL REFERENCE TO PUBLIC TRANSPORT IN DELHI METROPOLITAN AREA**

## **1.0 INTRODUCTION**

Public Transport is vital in fulfilling the mobility needs of the people in general and disabled persons in particular. The demand for transport services has steeply increased due to rapid urbanization, technological advancement and various reform agenda adopted by the government. The dispersed activities and fragmented land uses especially in metropolitan cities have further increased the average travel length of the commuters. The traffic bottlenecks due to high pressure of mixed vehicles on already congested roads, use of personalized vehicles and intermediate public transport, violation of traffic rules and non-priority to small vehicle/ wheelchair users, cyclists and pedestrians have severely affected the mobility level of the disabled persons. Though, in the past, few attempts have been made to address some of the issues concerning to the disabled persons, as far as the modern modes of public transport such as metro rail, bus rapid transit systems, etc. are concerned. But how to shift the disabled persons from one mode to other mode, how to access these modes of transport, and how to facilitate their seamless point-to-point travel from home to the final destination is becoming issue of debate.

## **2.0 DISABILITY A GROWING CONCERN**

The total population of India has grown from 361 million in 1961 to 1210 million in 2011. The urban population in India has increased from 62.4 million to 377 million, which registered 6 fold increase during the corresponding period [Census, 2011]. The total population of India is expected to be 1350 million by year 2021, where the urban share is projected to be 40% of total population of the country. The six mega cities viz. Greater Mumbai, Kolkata, Delhi, Chennai, Bengaluru and Hyderabad alone constitute 59.99 million populations (34.03 %) of total urban population (2001). Ironically, the growth of motor vehicles has surpassed the growth of metro population. Delhi alone occupies 4.19 million vehicles (34.28%) of the total vehicles of 12.22 million in these cities during 2005 [Road Transport Year Book, 2006-07].

The population of disabled persons in India has increased from 12 million in 1981, to 16.15 million in 1991 and 21.91 million in 2001. The disabled population in India registered an increase of 82.60 per cent during 1981-2001. Apart from this, there is substantial number of persons suffering from low vision, leprosy and are in old age group. With the present rate of growth, the disabled person population of India is likely to get multiplied further in coming years. Among the different types of disabilities, the prevalence of locomotors disability was highest in the country – it was 1046 in the rural and 901 in the urban per 100000 persons [ASRTU, Website]. This was followed by visual disability and hearing disability. The total disabled population of Delhi constitutes 0.24 million, which is 1.70% of the total population of National Capital Territory (NCT), Delhi as per 2001Census (Table 1.1). Besides this, nearly 37.82% of the total population of Delhi falls under the age group of 0-14 years and above 60 years, which need due care in mobility (Table 1.2). The distribution of total disabled persons by type of disability in NCT Delhi shows a glaring pattern. More than half of the disabled persons are visually impaired and another 27.51% are affected with locomotors disability. These two significant categories constitute 78.68% of the total disables persons in Delhi as per Census 2001. The corresponding figures for males and females are 78.71% and 78.62% respectively (Table 1.3).

The study undertaken on disabilities issue indicates that 9.15% of households in India have at least one physically disabled person. A significant proportion of households have even 2 or more than 2 physically disabled persons. The degree of disability indicates that 23% physically disabled persons cannot function even with aid, while 16 % can only function with aid and the 59% can function even without aid [Economic Survey of Delhi, 2008-09]. This broadens the scope of further research and calls for providing need based accessibility to this group.

**Table 1.1: Percentage of Disabled Persons in NCT Delhi- 2001**

Sl. No.	Total Population	Disabled Population	%age
	13,850,507	235,886	1.70

*Source: Economic Survey of Delhi, 2008-09*

**Table 1.2: Population in specific age group in NCT Delhi-2001**

S. No	Age Group	No of Persons	% to the Total Population
1	0-14	4,492,939	32.44
2	60+	721,650	5.21
3	Age not specified	21,216	0.15
	Total	5,235,805	37.80

*Source: Economic Survey of Delhi, 2008-09*

**Table 1.3: Total Disabled Persons by type of disability in NCT Delhi- 2001**

Sl. No.	Type of Disability	Total Persons		Male Persons		Female Persons	
		No	%	No	%	No	%
1.	In Seeing	120712	51.17	71342	49.24	49370	54.24
2.	In speech	15505	6.57	9421	6.50	6084	6.68
3.	In Hearing	8741	3.71	4855	3.35	3886	4.27
4.	In Movement	64885	27.51	42700	29.47	22185	24.38
5.	In Mental	26043	11.04	16554	11.43	9489	10.43
	<b>Total</b>	<b>235886</b>	<b>100.00</b>	<b>144872</b>	<b>100.00</b>	<b>91014</b>	<b>100.00</b>

*Source: Economic Survey of Delhi, 2008-09*

The global scenario of disabled persons is also not very encouraging. In Germany, the share of the elder generation (people older than 65 years) will grow to 30 percent by the year 2050 from 20 per cent today. This process is typical for the whole European region, where the number of elder people will considerably grow to 37.4 per cent between the year 2010 and 2030. This development is comparable to the situation in Japan. The share of elder people will be about 37 per cent in Japan in the year 2050. The Peoples Republic of China (PRC) is also increasingly confronted with an aging society due to the One-Child Policy. The share of the population which is older than 65 years has grown by about 50 per cent between the year 1964 and 2000. Today this is about 8 per cent of China's whole population.

### **3.0 TRANSPORT MOBILITY IN CASE STUDY TOWN**

The public transport supply in Delhi is mainly met through bus services and metro services. The sub-urban railways in Delhi cater to nearly 2 per cent of the total passenger supply [Ratna, 1999]. Delhi alone has 4.8 million vehicles on roads (2007), of which 65% were two-

wheelers, 30% cars and jeeps, while the share of buses was just 1 per cent. In the city nearly 40% of trips are performed by personalized modes, 41% by buses including school buses, 4% by metro/train and rest by para-transit system comprising taxis, auto-rickshaws and cycle-rickshaws. In terms of trip purposes in 2007, nearly 30.7% trips were performed for work, 14.8% for business, 38.8% for education and rest for other purposes [Gupta, 2010]. In metropolitan cities, the length and quality of roads (2 lane, 4 lane, etc.), transport facilities and other road side infrastructures did not increase proportionately with the vehicular population [Ratna,CECR,1999]. If such trend continues and more and more motor vehicles in the form of Tata NANO, and Mahindra Reva are added in fleet size, virtually there will be no space on roads for common man, what to talk about mobility of disabled persons?

### **3.1 Bus Transport Supply**

Bus services in Delhi are currently provided by private stage carriage operators (PSCs) under Delhi Government's Special Purpose Vehicle called Delhi Integrated Multimodal Public Transit System (DIMPTS), Delhi Transport Corporation (DTC) and the Delhi Metro Rail Corporation (DMRC), which provides connecting services to the metro rail system. However, such a system has been unable to deliver a comprehensive, integrated network in Delhi. The operators have tendency to run the buses services only on profitable routes, leaving half of the Delhi's 657 registered bus routes and depriving the commuters. The commuters are forced to use personalized mode of transport. Most the buses, except the low floor buses which have wide door to allow the wheelchair, do not have built environment for wheelchair users. Of late the DTC has taken initiative with help of an NGO (Samarthya) for Construction of Bus Queue Shelter (BQS) suiting the requirements of the physically challenged commuters [DTC website]. In the existing scenario, the supply of transportation and available infrastructures are hardly adequate when it comes to meeting the demands of the disabled persons.

#### **3.1.1 Bus Rapid Transit**

There are many successful examples of Bus Rapid Transit (BRT) system worldwide at Amsterdam, Beijing, Bagota, Brisbane, Guangzhou and Utrecht. The BRT in India has been identified to address the public transportation infrastructure needs. It provides adequate transport capacity to meet the demands in many corridors. Various hierarchy of transport modes, if well integrated would provide seamless travel via transit system on one hand and reduces transfer times and waiting time between different types of services on the other hand. The service design integration evident in Curitiba exhibits user benefits in ways that can be measured both quantitatively and qualitatively. In Delhi, in first phase seven dedicated corridors totaling 115 kilometer of length has been approved of which 14.5 kilometer stretch is under operation out of sanctioned length of 308 km. The other metropolitan cities where BRT is sanctioned include Pune (101 km), Indore (89), Bhopal (40), Ahmedabad (217), Jaipur (138), Vijayvada (46), Vishakhapatnam (160) and Rajkot (84 km) [ITDP Report, 2007].

### **3.2 Metro Services**

Delhi Metro is one of the most disabled friendly public transport systems in India and all stations have ramps from the streets so that wheelchair-bound persons can directly roll up to the lifts. The control panels inside all lifts are placed at a low level so that persons on wheelchairs can access these without having to strain themselves. Besides, there are buttons with inscriptions in Braille for the use of the visually challenged. The detail information about Metro and DTC buses are given at Table 1.4.

### 3.2.1 Metro Interchanges

The metro system has 138 metro stations including 4 interchanges at Kashmere Gate, Rajiv Chowk, Inderlok and Yamuna bank. The New Delhi metro station connects to T3 Airport Terminal through Airport Express (Metro rail), which attracts large number of commuters. Incidentally, there is no integration with road based transport and surrounding areas of interchanges for wheelchair users to access these interchanges.

**Table 1.4: Detail information about Metro and DTC buses**

*(As on July 2011)*

S.No.	Delhi Metro		DTC Buses		
1	No of Train sets	Total	200	Total buses (as on July 2011)	6183
		Six coaches	59	No of low floor buses	3767
		Four coach formation	141	No of Standard DTC buses	2416
2	No of metro lines operational		6	Av. age of standard buses in years	6-8
3	No of Train trips per day		2500		
4	Kilometer coverage per day		69000	<b>Metro Feeder Services</b>	
5	Ridership p/d in million (July 2011)		1.7	No of Metro feeder buses	120
6	Number of Metro station		138	No of Feeder bus routes	17
7	Length of metro network in km on completion of Phase-III (108 km) by 2016		295	No of metro station from where Feeder bus service available	14
8	Expected ridership per day by 2016 (in millions)		4.0	Total No of Feeder bus routes (proposed)	89

*Source: Compiled from DMRC web site and DTC Operational Statistics, July 2011.*

### 3.2.2 Accessibility at Pitampura at Metro Station

Pitampura metro station has been selected for detailed study, which is located on oldest metro line 1 of Dilshad Garden-Rithala line (Fig. 1.0). This is most vulnerable from points of traffic volume. It has combination of 550 meters long underpass. The metro station is located on outer ring road through which Outer Ring Road Buses, Gramin Sewa, Haryana Roadways Buses, Rural Transport Vehicles (RTV) and Metro Feeder Buses ply. Within 1 km radius of Pitampura metro station, the major land use located include institutional buildings such as Special Art School (Special School for differently abled), School for Handicapped, Management Institutes of Rukmini Devi, Technia, Geeta Ratan, District Court Rohini, Forensic lab, Delhi Development Authority Zonal office, Delhi Institute of Fire Research and Training, Commercial Area of Shiva market and Tibetan shops, Multistoried parking (under construction) at Shiva market, various laboratories, diagnostic centres and residential colonies which attract and disperse sizeable number of commuters daily. Metro station of Pitampura at Madhuban Chowk is gateway of Rohini but Madhuban Chowk intersection has been converted into a mess. There is no provision of any subway or segregated paths for pedestrians and disabled persons to cross the busy roads. The subway is located at Sarswati Vihar which lacks ramp and other facilities and is mostly unused. Within the Metro premises and inside the metro rail, the care has taken to provide facilities for disabled

persons. How to travel on discontinuous footpath and how to access the metro as a safe pedestrian, especially as a disabled person is a big question?

### 3.3 Metro Feeder Services

Metro feeder buses are operational in Delhi in order to increase ridership of Delhi Metro and facilitate the commuters living in remote areas [Table 1.4]. The metro feeder buses have seating capacity of 18 to 20 persons. There are three Metro Links (ML) of feeder bus services at Metro Station, Pitampura.

- i) ML-15 (Minus Route) with 6 vehicles connects to Sector 7-17 of Rohini, Rithala Metro and Pitampura in total distance of 15 km. They complete 12 trips daily from 6 AM to 9.30 pm.
- ii) ML-15 (Plus Route) with 6 vehicles connects to Sector 7, Naharpur, BSA Hospital, Rithala, Sec 9-17 Rohini and Pitampura in total distance of 15 km.
- iii) ML-19 with 4 vehicles daily connects to Chandralok, Ranibagh, Sarswati Vihar, Pushpanjali, Police line and West Enclave in total distance of 7 km.

The minimum and maximum fare is Rupees five and eight respectively. These buses are quite often overloaded and there is no provision for wheelchair users, as they are high floor buses. The rest of the commuters have increasing dependence on para-transit system such as cycle rickshaw, RTV and Gramin Sewa to move around a metro station and its catchment areas.

**Fig 1.0: Location of Madhuban Chowk, Pitampura Metro Station, Delhi**



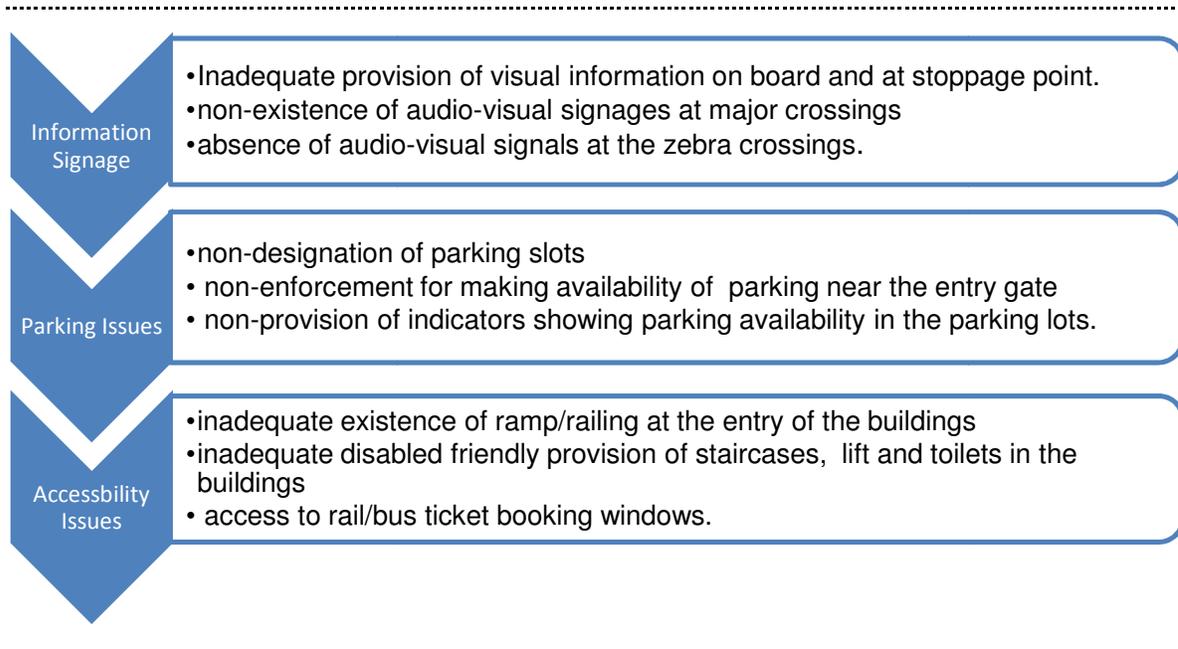
*Source: Google Map*

In the present scenario, the disabled persons have to compete with so called abled-persons in order to take up the journey. India's fast rate of urbanization and industrialization does not seem to match with the supply levels of public transport because of financial constraints. Today the personalized transport has become more necessity than a luxury for

the urbanites. The inadequacy of public transport forces to own personalized transport for saving time and ensuring convenience. The mobility of disabled persons is restricted because of heavy traffic congestion and mixed transport all trying to reach the destinations in quickest possible time. The emerging problems of the disabled persons and associated factors are presented at Fig. 2.0.

The movement of the disabled persons is affected on account of one factor or combination of factors. They include i) driver factors (non-adherence of stopping buses in bus-bays, non-cooperation with disabled persons insufficient haltage time at bus stops. ii) road and environment factors (lack of guiding blocks, encroachment of bus stops unauthorized parking, faulty sidewalks non-existence of segregated and exclusive lanes road layout and surface quality, and iii) vehicle factors (incompatible steps of vehicles, lack of uniformity in design of vehicles, inadequate width of door of buses, deficient earmarking of seats in private buses).

**Fig. 2.0: Emerging problems of the Disabled Persons**





*Source: Author's own conceptual framework*

The efforts have been made to provide manual hinged instead of hydraulic retractable ramp, seat belts, head rest and user friendly clamping system for wheelchairs and lower stop request button as far as BRT buses are concerned. However, there is feeling of insecurity by the disabled persons while travelling in the private buses. The lack of information and signage, inadequate provision of visual information on board and at stoppage point, non-existence of audio-visual signages at major crossings, absence of audio-visual signals at the zebra crossings have further aggravated to the problems. The access to buildings, lift, toilets and access to rail/bus ticket booking windows and parking areas need to be uniformly adopted. The city mobility plans, well integrated with development plans having proper land use distributions with focus on multi-model integrated and seamless public transport system and enforcement of laws will enable the disabled persons to access the facilities in a smooth way.

### **3.4 Flyovers and Bridges**

The Delhi roads have become roller coaster, full of flyovers, rail bridges and over bridges. These are least user friendly as far disabled persons choice and sustainable modes of transport such bicycle and walk trips are concerned. The number of flyovers in Delhi is given at Table 1.5. Forty per cent of the roads of Delhi do not have footpath. Out of existing footpaths, at least 40% pedestrian facilities are not suitable for walking and would require improvement [Advani M, Durai BK, Gupta K, 2010]. The digging of pavement for telephone cable by MTNL, electric cable (NDPL), gas pipeline (GAIL) water pipe (DJB), sewer line and roads (MCD) road pavement (PWD) is very common, which create hindrance to wheelchair users and visually impaired persons. The existing footpaths need to be reviewed to find the gap between the facilities provided and their suitability for disabled persons.

**Table 1.5: Number of Flyovers in Delhi**

S.No	Flyovers Details	Number
1	No of Flyovers constructed (2000-09)	37
2	No of Flyovers and road under bridges (under construction)	16
3	No of Flyovers and over bridges (planned)	20

*Source: Advani M, Durai BK, Gupta K (2010), Evaluation of Pedestrian Crossing Facilities, UT Journal, Vol. 9, No 2.*

## **4.0 CONSTITUTIONAL PROVISIONS, POLICIES AND GOVERNMENT INITIATIVES**

Numbers of policies and government initiatives have been taken to safeguard the interests of disabled persons. A few are illustrated below:

### **4.1 PwD Acts**

The Persons with Disabilities (PwD), Equal Opportunities, Protection of Rights and Full Participation Act, 1996, is enacted with main objectives to create equal opportunities,

protection of rights and non-discrimination of persons with disabilities. Chapter VII of the Act, Sections 44 to 46 deals with non-discrimination in transport on the roads and in the built environment. It provides for installation of auditory signals at red lights on public roads, for kerbs and slopes to be made on pavements for easy access of wheelchair users, devising appropriate symbols of disability and warning signals at appropriate places. With regard to the built environment, provisions have been made for ramps in public buildings, adaptations of toilets for wheelchair users, Braille symbols and auditory signals in elevators. The Bureau of Indian Standard Code and National Building Codes of India had provided for guidance and provision for requirement of physically handicapped in the public buildings.

#### **4.1.1 Model Building Bye-Laws**

The Town and Country Planning Organization (TCPO), has prepared Model Building By-Laws, which were circulated to the State Governments for adoption. However, barring the states of Rajasthan, Gujarat and Delhi and a few more, others are yet to adopt Model Building Bye Laws. The Ministry of Urban Development has amended the existing building byelaws to make public buildings or at-least the ground floor accessible for persons with disabilities. Chief Commissioner for Persons with Disability has issued document on "Planning a Barrier Free Environment". As a follow up the different ministries such as Ministry of Agriculture, Rural Development, Human Resource Development, Industries, Trade and Commerce, Railways and Planning Commission, CPWD, etc. have provided necessary barrier free environment. However, in many instances the adaptations such as ramps or toilets especially in schools, bus-stands, recreational areas, etc. have been done without following the basic minimum standards as specified in the guidelines.

#### **4.1.2 Barrier-Free Railway Stations**

Ministry of Railways has introduced short, medium and long-term targets for making railway stations barrier free. The short-term target aims at creating A-class railway stations (100,000 passengers/users) barrier free. The mid-term target will take care of B & C class stations and long term would cover D and E class railway stations.

#### **4.2 Projects Initiative Impacting Urban Mobility**

The Centrally Sponsored scheme of Jawaharlal Nehru Urban Renewal Mission (JnNURM), has initiated a strategic focus on urban mobility and transportation in selected 63 JnNURM cities. The introduction of modern city bus services with private sector participation, implementation of bus road transport system projects, implementation of Metro projects for Bengaluru and Kolkata, implementation of metro projects at Hyderabad, Chennai and Mumbai under PPP mode have multiplied the urban mobility level in the country. Some of the initiatives for urban mobility under the JnNURM include Urban Transport Fund, setting up of Land Transport Authorities, preparation of Comprehensive Mobility Plans, launching of innovative projects for scientific management of auto rickshaws and adoption of clean development mechanism.

#### **4.3 Access Audit**

The accessibility has been one of the most neglected issues in the disability sector. The environmental access is a set of norms designed to provide safe and independent use of varied environments such as transportation, roads, buildings and communications by people with disabilities. It is observed that millions of disabled persons in India remain confined to their homes as the surrounding environment viz. buildings, parks, shops, etc. are inaccessible and unsafe. A cursory review of the initiatives taken by various Ministries of

Government of India certainly suggests that a good beginning has been made. However, a visible impact of these initiatives is conspicuously absent.

## **5.0 EXAMPLES OF BARRIER-FREE ACCESSIBILITY IN ASIAN CITIES**

**United Nations** Economic and Social Commission for Asia and the Pacific (ESCAP) with support of Japan Government undertook pilot projects in three Asian cities of Bangkok, Beijing and New Delhi for creation of barrier-free physical environments. The projects in Bangkok included improvement of 11 streets (15 km) in the vicinity of National Stadium in two districts of Pathumwan and Rajathevee covering an area of 2 sq km. In Beijing two sites namely Wangjing and Fangzhuang were selected for improvement. The projects included improvement of kerb ramps for wheelchair users, tactile Braille pathways and Braille markings on bus stops for blind and visually impaired persons. Clear signages at banks, post offices, schools, shopping centres, and leisure and cultural centres were put in place to help disabled persons. Other improvements included the installation of hand rails and accessible toilets. The pilot project at New Delhi covered improvement of 14 buildings spread in one sq. km area at I.P. Estate. The components for improvement included ramp/railings at entrance, toilets, reception counters, and provision of signages, pathways, and guiding blocks within the premises of the buildings concerned.

Similar projects were undertaken in Singapore, where five year Barrier-free Accessibility Upgrading Programme (2007-2011) was implemented. The key areas and buildings in Singapore were made barrier-free to enhance the accessibility. The buildings were built to comply with the Code at different times. MRT stations were also retrofitted and made accessible and recently the buses are made accessible to the wheelchairs. The challenge now is to ensure a seamless point-to-point travel from home to final destination. Imagine yourself stepping out of your house, using the walkways to get to the bus stop/MRT Station to reach your next destination, only to find out that the building is not accessible. Would you want to step out into the built environment again ?

## **6.0 FUTURE STRATEGIES FOR IMPROVEMENT OF ACCESSIBILITY**

There is need to improve public transportation services particularly with a focus on disabled persons. Followings are the future strategies suggested for improvement of accessibility, which will generate the potential of providing good education, better job opportunities and better social and cultural integration.

### **6.1 *National Data Bank on Disability***

A major challenge faced by the policy makers, planners, transport engineers, pedestrian and disabled persons is the non-availability of detailed data on pedestrian/disabled person. By the help of Geographical Information System (GIS), Unique Identification (UID) Scheme and other techniques, it is recommended to prepare maps showing high concentration of the disabled persons. This will help in prioritizing the action plan for providing accessibility to the disabled persons and modeling their travel demand.

### **6.2 *Accessibility to Metro Station/Bus Stop Environment***

Provision for accessibility is made within the low floor buses, metro rail, metro station and parking places for disabled persons but how to reach the parking place, bus stops or metro stations is challenging job for the disabled persons. A disabled person is confronted with series of problems right from the origin of his/her journey i.e. walking through the narrow street, reaching at the bus stop, boarding the bus, travelling within the bus, alighting from the

bus and finally reaching the destination. In many cases their journey involves change of more than two modes of transport or combination of bus transport and metro rail. Delhi Metro Rail Transit System (MRTS) would not solve all the problems associated with the movement of disabled persons in the city. A conducive environment has to be created in the city beyond MRTS [Ratna, 2006]. Proper coordination is needed among different stakeholders and facilities providers keeping in view of the access to the total environment.

### **6.2.1 Actuated Signalisation**

There is need to have proper signaling systems at all the crossings, providing information to radial ways inclusive of traffic police regulating the traffic flow, pathways connecting metro stations and bus stops, supporting features at metro interchanges in order to facilitate the mobility of disabled persons.

### **6.2.2 Adoption of Common Pavement Design**

The municipalities/urban local bodies across the country should adopt common pavement design, universally adopted signage to effect the uniformity in terms of provision of such facilities to the disabled persons.

### **6.3 Transit Oriented Development**

In order to discourage the use of personalized transport, the Transit Oriented Development (TOD) as envisaged in Master Plan of Delhi (MPD)-2021 document, needs to be preferred. TOD means the creation of denser, mixed use activity nodes connected by high quality public transportation. The TOD allows the people to live, work, shop and to have entertainment in the areas accessible by transit [MPD, 2021]. The BRT Delhi has set an example of TOD through meticulous planning which help disables and the pedestrians.

### **6.4 Improving Service Level Benchmark**

The Ministry of Urban Development has prepared the documents on Service Level Benchmarks (SLB) in the areas of Public Transport and allied facilities. While working out the level of services (LOS) for pedestrian infrastructure facilities, three indicators i.e. signalized intersection delay, street lighting and percentage of city covered with footpaths have been taken in to consideration [UTI, 2010]. It says that If 75% of the city is covered with footpath (more than 1.2 m wide) city is assigned LOS 1. While defining the indicators, the disabled persons' facility is not considered. Why 75% of the city covered with footpaths (more than 1.2 m wide) should be given LOS 1, when the footpaths are not environmental friendly with the movement of disabled, when there are no chequered tiles or guiding blocks on footpath or segregated lanes to facilitate disabled persons and cyclists? Similarly, why 10 minutes delay at streetlights for pedestrians is counted LOS 1, when there are no audio-visual provisions made for the disabled? Worldwide 10 minutes delay is high figure. Is it that India will have different LOS? What would yield the presence of merely the number of public transport system, its good frequency and what will yield LOS 1 when the system is not approachable by the wheelchair users, when integration is not thought of ?

### **6.5 Adoption of Spatial Development Plan**

The Spatial Development Plan as indicated in 12<sup>th</sup> Five Year Plan (Draft Report of the Working Group on Strategic Urban Planning) should indicate the provision of residential, educational, recreational and employment sector for disabled persons [12<sup>th</sup> FYP, 2011]. The public participation from this group should be ensured while formulating the Ward Plans,

District Plans and Metropolitan Plans as per 74<sup>th</sup> Constitutional Amendment Acts (CAA). The strategic planning is required for housing in future by the development authorities. The disaster plan should be prepared which should identify the vulnerable points and focus the accessibility of disabled groups. Such plans should be prepared in accordance with Disaster Management Act.

### **6.6 Improvement of Employment Opportunity**

The alarming magnitude of unemployment among the disabled persons is the major obstacles for their economic growth. The employment scenario of the disabled persons is to be viewed with the quality of employment in terms of income and work environment. The employers are poised with query that “when able-bodied qualified persons are readily available, why to employ disabled persons” ? With having recession, the employers will be more adamant even. The experience shows that adaptability and acquisition of skill of disabled persons is no way inferior to the able-bodied. There is need to have change in attitude and mind set of the employers and provision of accessibility to facilitate their movements. The genuine efforts has to be made to remove any discrimination in sharing the developmental benefits thereby integrating this groups with the social mainstream for their all round development.

### **7.0 CONCLUSION**

In order to understand the basic issues of disability, it is imperative to address various factors such as needs, limitations, preferences, attitude and culture and geographical location of the disabled persons which influence the travel behavior of these people. Such understanding can help in modeling travel demand and finding best options to meet their travel demand. Creating a barrier free environment requires association of government, policy makers, architects, builders, town planners, people with expertise in disability issues, and most importantly, people with disabilities themselves. Ensuring that there is a safe and continuous end-to-end connectivity will no doubt encourage everyone in the community not only to step out and to be part of the community but also to participate in all its activities.

More the urban transport is made dynamic through various initiatives adopted; more will be the scope of mobility of goods and passengers. There has to be paradigm shift in approaches in making barrier-free environment to the disabled persons. There is need to protect the interests of disabled persons, pedestrians and cyclists at the core of all urban infrastructure and transport projects. There is also need to align the land use and urban planning as per the mobility requirement of the disabled people. The provision for making barrier-free environment may be extended horizontally (all parts of the city, all building, institutions) and vertically (starting from small towns to medium towns and finally to metropolitan cities) in a phased manner.

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