Footfalls

OBSTACLE COURSE TO LIVABLE CITIES

RIGHT TO CLEAN AIR CAMPAIGN

2009

CENTRE FOR SCIENCE AND ENVIRONMENT, DELHI

The Centre for Science and Environment (CSE) is a public interest research and advocacy organisation based in New Delhi. The Centre researches into, lobbies for and communicates the urgency of development that is both sustainable and equitable.

The scenario today demands using knowledge to bring about change. In other words, working India's democracy. This is what we aim to do.

The challenge, we see, is two-pronged. On the one hand, millions live within a biomass-based subsistence economy, at the margins of survival. The environment is their only natural asset. But a degraded environment means stress on land, water and forest resources for survival. It means increasing destitution and poverty.

Here, opportunity to bring about change is enormous. But it will need a commitment to reform — structural reform — in the way we do business with local communities.

On the other hand, rapid industrialisation is throwing up new problems: growing toxification and a costly disease burden. The answers will be in reinventing the growth model of the Western world for ourselves, so that we can leapfrog technology choices and find new ways of building wealth that will not cost us the earth. This is the challenge of the balance.

Our aim is to raise these concerns, participate in seeking answers and — more importantly — in pushing for answers and transforming these into policy and practice. We do this through our research and by communicating our understanding through our publications. We call this knowledge-based activism. We hope we will make a difference.

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CONTENTS

Right to clean air campaign

Centre for Science and Environment blew the lid on smog and smog makers in 1996 in its book *Slow Murder: The deadly story of vehicular pollution in India*. The study found that the problem of vehicular pollution in India was the result of a combination of outdated engine technology, poor fuel quality, lack of transportation planning and bad maintenance of vehicles on roads. Yet during the early nineties government was indulging in the game of blaming the victims of air pollution by forcing on them a system of pollution under control certificates. The hype over this periodic drive to test tailpipe emissions in the absence of strong action in other areas was cosmetic and diverted public attention from more serious issues of technology, fuel quality and transportation planning.

The connection between poor urban air quality and multiple factors eluded most Indian citizens. To help citizens see through the smokescreen of pollution, to understand the vital CONNECTION and protect public health the *Right To Clean Air Campaign* was launched in November 1996. Since then we are consistently campaigning to:

- **improve the decision making processes related to air quality and mobility planning**
- **build pressure for more transparent policy mechanism**
- **raise public awareness about poor urban air quality and risks to public health.**

This led to an intense phase of learning, action and impacts. The first generation action has helped in arresting the runaway air pollution in some cities. But clean air remains elusive in most cities. It is time for second generation reforms. The future action will have to be more aggressive across the country to cut exposure to killer fumes, reduce energy use and climate impacts of motorisation. The explosive increase in vehicle numbers threatens to undo the small incremental gains. Cities will have to reinvent the idea of mobility, shift towards public transport and non-motorised transport, leapfrog vehicle technology and fuel quality and improve fuel efficiency. Cities will have to find a whole new way out of the choking haze of polllution, congestion and energy guzzling.

If you agree with us, remember to give us your support.

WHY THIS STUDY?

The number is stunning. Even today nearly one third of daily travel trips in Delhi, and more than half of Mumbai are walk trips. In most other Indian cities people who commute by walking outnumber those who use their vehicles. Yet, the walkers remain invisible in the maze of motorized traffic that chokes our roads. Pedestrians walk in extremely unsafe and hostile conditions, in constant conflict with motorized traffic and are easy victims to crashes and accidents. Countless people trip over potholes, slip on sludge, or are grievously hurt by bumping into numerous obstacles strewn along the footpaths. There is continuous erosion of space for walkers even though every journey begins and ends with a walking trip. Our civic authorities have little respect for them.

The high share of walking in Indian cities has come out sharply from the nation-wide assessment carried out by the US based consultant body, Wilbur Smith for the Union ministry of urban development on traffic and transportation policies and strategies in urban areas in 2008. The share of walkers can vary between 16 to 57 per cent depending on the nature and size of the city.

It is ironical that despite such high share of walk trips the cities are not walkable. Walkability simply reflects the quality of walking facilities and conditions that make walking safe, comfortable and convenient. In any typical city the pedestrian facilities and network includes sidewalks, path, crosswalk, stairways, curb cuts, ramps and transit stops. These need to be well designed, intricately connected to help pedestrians to take the shortest direct route to destinations and feel safe.

But how walkable are our cities? The Wilbur Smith study has indexed 30 cities of all sizes on walkability and assessed them based on availability of foot paths on major arterial roads, and overall facility rating by pedestrians themselves. The perception of pedestrians has also been gauged on availability of footpath and its quality, obstruction, maintenance, lighting, security from crime, safety in crossings etc. A low rank indicates inadequate and substandard pedestrian facilities. The national average index is 0.52. The best in the country according to this ranking is Chandigarh with 0.9. This is in sharp contrast to cities like London that score 1.5 to 1.7 and have active policies to encourage pedestrian traffic.

Walkers simply don't matter in planning approaches. This is grossly evident from the state of sidewalks that are being steadily chipped away to provide more space for carriageways of motorized traffic. Wilbur Smith study has found that the percentage of the road with pedestrian footpaths runs hardly in 30 per cent in most cities. Even the little that exists is clogged with hawkers, vendors, urinals and electric transformers in unplanned manner. Cities have marginalised the needs of the pedestrians and given priority to the needs of the automobiles.

Yet our cities were built to be walkable. High density, mixed land use, and narrow streets have made walking for work and recreation comfortable, feasible and popular in traditional Indian cities. In any typical city the core could just be 5 km

across and easily walkable within a reasonable time. Studies have shown that more than 40 to 50 per cent of the daily trips in many of our cities have distances less than 5 kilometers. This has enormous potential to convert to non-motorised and especially walking trips. City cores even in mega cities of Kolkata, Mumbai, and many others have retained some of the characteristics of high density, mixed-land use and short trip stretches. But these features are fast disappearing as urban sprawls are expanding.

Walking is under severe stress from all sides. Wrong policies are leading to urban sprawl, increasing journey distances and making cities less walkable. This is so evident in Delhi. Car centric infrastructure for seamless, signal free travel through flyovers, expressways and elevated ways, is severing urban landscape, disrupting direct shortest routes of the walkers and increasing distances and travel time for walkers. Insatiable need for space for motorized vehicles is leading to arbitrary surrender of walking space in cities. Social disdain towards walkers is another cause of neglect of walking space.

It is time to set a whole new term of policy debate that can compel regulators to seek solutions to find a whole new way of organizing cities to improve the quality of urban life. Getting good walk ways is only the first step towards creating non-motorised space in our cities. It is possible for cities to move directly to high end public transport and an urban way of life that is dominated by walking and cycling. Modern transport infrastructure development is at a take off stage in our cities. If the infrastructure design gives priority to pedestrians, cycling and public transport the mobility paradigm can be transformed and made more sustainable.

This is possible only if the policy understanding can be built on the linkage between walking and the sustainable travel options in cities.

WHY WALK?

Overcome mobility crisis that has paralyzed cities: Congestion, crawling traffic and high pollution levels have made cities unlivable. In many Indian cities congestion now occurs for longer portion of the day, cause inordinate delays that affect more people and goods then ever before. Congestion imposes high costs on urban communities – it can be as high as 2 - 3 per cent of the GDP. More than half of the cities are critically polluted in India. Explosive numbers of vehicles and increased driving distances are also inciting gas guzzling and climate impacts. This will get a lot worse if vehicle numbers continue to increase, more commuters shift to personal vehicles, and transport infrastructure is planned mainly for cars.

Already huge investments have been made in roads, and elevated roadways. Yet, this has not helped to solve the problem. Delhi, the capital city of India, is most privileged to have more than 20 per cent of its land area under roads. It is continuously resorting to road widening and flyovers. And yet the city is gridlocked. Traffic speed and road availability per vehicle has dropped consistently over time. A 2005 RITES study predicts that between 2001 and 2021 Delhi's population will grow from 14 million to 23 million – by nearly 67 per cent and vehicular trips per day will grow from 10.7 million to 24.7 million – by as much as 131 per cent.

This is happening because policies and urban planning are increasing automobile dependence. The reversal of this trend is possible only if at least 80 per cent of the trips can be converted to public transport trips. And this will have to be supported by elaborate network of pedestrian ways to facilitate the public transport users and

also prevent motorisation of short distance commuting.

Walking is a crucial link to public transport: Any attempt to augment public transport and increase its usage will lead to correspondent increase in walking. It is roughly estimated that public transport users are also walkers four times every day. Experts point out that even 50 per cent increase in kilometer traveled by public transport would lead to massive increases in the quantum of walking. Right to Clean Air Team in CSE has counted more than 150 persons walking per five minutes during the peak hour in the bus rapid transit (BRT) corridor in Delhi. This will increase further if public transport ridership also increases in future. Roads will have to be planned with more holding areas. Therefore, the city has to plan the pedestrian infrastructure to cater to the present and future demand for walking in the city.

There is already a crisis in Indian cities in terms of continuous erosion of public transport trips. The stark evidence comes from the 2008 report of the Wilbur Smith and Associates for the Union Ministry of Urban Development. It shows the share of public transport has dropped from 60 per cent in the beginning of this decade to 43 percent of all motorized trips in Delhi. The share is expected to drop further in future in both small and big cities of India. Overall drop is expected from 26 per cent in 2007 to 17 per cent in 2021 and 14 per cent in 2031. In the mega cities where the share is higher it will drop to 36 percent.

Despite the dire predictions it is hoped that the modal share of public transport will improve if effective policy interventions are made. Delhi is investing massively in public transport improvement before the Commonwealth Games. On a nation-wide scale under the Jawaharlal Nehru Urban Renewal Mission (JNNURM) a large number of cities have planned to build public transport system. This includes BRT based on the principle of segregation of road space according to road users. Also the recent stimulus package from the Union ministry of urban development under JNNURM that includes one time grant for bus purchase is expected to augment and expand bus transport in cities. Nearly, Rs 4726 crores have been sanctioned for about 15,000 buses in 59 cities. This grant is linked to conditional reforms in the transport sector in cities that includes higher taxes on private cars, dedicated funds for public transport, parking policy as a car restrain measure and bus sector reforms.

These policy instruments can play an important role in expanding bus transport. This will demand rebuilding of pedestrian infrastructures in cities and strengthening policy action of the state governments. Walking and cycling will have to be given the legitimate space and made part of conditional reforms. The pedestrian infrastructure should be planned to cater to the present and future demand for walking that will be generated from the higher usage of public transport.

Moreover, pedestrian ways will have to be creatively designed to fulfill one of its fundamental role of modal integration. Walkways are important linkage needed for effective transfers between different modes of public transport especially at the interchange points. If this is neglected in the planning stage, it will dampen public transport usage.

Reduce vehicle use for short distance commuting: While all journey ends and begins with a walk trip, a large number of people walk to access essential services like education, local shopping, leisure trips within neighbourhoods and job centres. Many of these journeys are usually less than a kilometer or two. This is very signifcant part of non-motorised trips that has enormous potential for pollution mitigation. But increasingly, the walking trips within this distance range are being replaced by motorized trips due to hostile walking conditions. The experience from

other countries shows that a significant proportion of the car trips in the distance range of 3 kilometers can be easily substituted by walking trips if adequate steps are taken. For instance, in Bogota 70 per cent of the car trips were below 3 kilometer in 1998. This has now reduced with improved access to pedestrian facilities and augmentation of the public transit. Even in well planned German cities 80 per cent of the car trips in the distance range of 3 kilometers are being targeted to be substituted by non-motorised trips.

This is evident in other Asian cities as well. The US based International Transport Development Programme has demonstrated in Surabaya in Indonesia, that pedestrian barricades and one-way streets meant to facilitate long distance motorized trips force longer walking distances in neighbourhoods that encourage switch to motorized vehicles. According to their estimates these pro-car measures have generated additional daily 7000 kilometers of vehicle traffic that are easily substitutable by walking trips. Thus, there is an enormous potential to convert short distance trips to non-motorised trips.

Walking and urban poor: There is a complete policy disdain when it comes to addressing social and equity concerns in mobility planning. India's urban poor are too poor to even afford a bus ride for daily commuting. Often the only option for them is to walk. Urbanization in our country is marked by a growth of unauthorized colonies, slum clusters and low income neighbourhoods in big cities. The low income households are captive pedestrians and many are captive bus riders. This poses a serious equity challenge.

In Delhi, about 60 per cent of the population lives in low income neighbourhoods. There are about 1500 unauthorized colonies and 1200 *jhuggi jhompri* (JJ) or slum clusters. An older IIT survey of the JJ clusters in 1999 showed that people having a monthly income of Rs. 2000 a month commuted to work by either bus, cycles or walking. The respective share has been 22.1 percent for walk, 31.43 percent for buses and 38.87 percent for bi-cycles. In Mumbai nearly half of the population lives in slums. They form the urban majority. Unfortunately, often these clusters are moved to the urban periphery making cost of transportation often prohibitive for the poor as they have to depend on long distance public transport. Lloyd Wright, transportation expert from Osaka University and associated with the Institute for Transportation and Development, who has studied car free movement extensively, has pointed out that often such moves as in Delhi have affected women employment adversely as accessibility for them became a problem. Mobility of nearly half of the people in some of our cities can be severely compromised if walkways lose viability.

Walking demands safe environment: It is a harrowing experience to walk in an Indian city. Road accidents in the country claim more than 80,000 lives every year, mostly pedestrians, cyclists or pavement dwellers. With the country's expanding middle class looking at motor vehicles as an indispensable extension of itself, the pedestrian's right to safe and free passage has become a casualty. The National Urban Transport Policy sums the situation aptly: "The use of cheaper non-motorised modes like cycling and walking has become extremely risky, since these modes have to share the same right of way with motorized modes."

A very recent study carried out by a team of researchers of University of Michigan along with Dinesh Mohan of Indian Institute of Technology, Delhi, on *Transportation Research Institute on Road safety in India: Challenges and opportunities* and released in March 2009, shows that road traffic fatalities have been increasing at about 8 per cent annually for the last ten years. Pedestrians account for about 60 per cent of all

fatalities in urban areas, substantially more than the most high income countries. Even on highways 20-40 per cent of the fatalities involve pedestrians, and bicyclists. In a city like Mumbai 78 per cent of the traffic fatalities involve pedestrians.

Pedestrian environment is continuously deteriorating in Indian cities. As awareness level regarding the pedestrian rights is very poor people begin to accept the poor conditions of walking infrastructure as fait accompli. But slowly public angst is raising its head.

Walking enhances urbanity and lifestyle: The renewed interest in walking globally is a fall out of the interest in building cities in new ways to reduce energy, pollution and climate impacts of urbanisation. This is central to reversing automobility. Compact cities need well planned mixed land-use, well managed density and congenial pedestrian environment to make neighbourhoods safe and vibrant. This can shorten trip length that can become walkable.

In the western world even health dynamics is playing an important role in reinforcing walking, as a measure to fight obesity. In a study reported in the Journal of Physical Activity and Health, in 2008, (Issue 5, 795-814) the transportation experts including John Pucher have stated that walking and bicycling are much more common in European nations than in the United States, Canada, and Australia. And they have found a correlation between active transportation that involves walking and obesity. Given the fact that physically active individuals gain less weight over time, it is possible that active transportation is one of the factors responsible for international differences in obesity rates. Studies in China have found that Chinese men who acquired a car experienced a 1.8 kg greater weight gain and were twice as likely to become obese compared with men whose vehicle ownership remained unchanged. These findings held even after adjusting for diet.

A US study in King County shows that the average resident of a pedestrian friendly neighbourhood drive less than those living in sprawling neighbourhood and the resident of walkable neighbourhood weigh 7 pounds less and suffer fewer car accidents. Zero pollution and zero fossil fuel energy make walking one of the most eco friendly modes of transport in Indian cities. The World Health Organisation (WHO) is now making an explicit link between the walking and improvement in health status of the community.

In Indian cities neighbourhood parks are now beginning to get walk paths for recreation and lifestyle measure. But this will have to be mainstreamed into road building.

ANGRY PROTEST IN CITIES

There is simmering anger in Indian cities as the elevated roads, road widening, flyovers and clover leafs are disrupting the most direct route for walking, and pushing people to foot overbridge, skywalks or to underground passes. At the same time the choked pavements have become extremely unsafe for walking. Car infrastructure is severing links between adjacent urban locales, forcing people to make motorized trips even for small distances.

People are fighting for their space and right to walk. Voice of protest can be heard in Hyderabad, Chennai, Delhi, and Mumbai. Activists like Kantimathi Kannan have moved courts in Hyderabad to demand their right to walk. Samarthyam, a Delhi based group has taken up cudgels to defend the rights and interest of the disabled

and the mobility challenged. They have organized surveys in Delhi to highlight how the design of the pedestrian walkways have not considered the special needs of the disabled. Praja in Chennai and Bangalore is looking at ways to reform the guidelines on roads and footpaths to make it pedestrian friendly. A small town of Fazilka in Ferozpur district of Punjab has banished cars from a busy shopping centre, Ghanta Ghar and pedestrianised it completely. It is served only by ecocabs that are non motorised rickshaws. This has actually improved business in the area.

This movement needs to gather momentum across all cities of India. Community awareness regarding the walkways and their rights need to be enhanced. Policies on pedestrian ways and pedestrian rights are the weakest link in the urban transport policies and urban development policies in India today.

CSE TEAM TAKES A WALK IN DELHI

Having understood the importance of walking it became necessary to check out the state of walking in Delhi. The Right to Clean Air team at CSE therefore conducted a random survey in selected locations in Delhi to asses the status of pedestrian walkways. The purpose was to identify the key barriers that undermine the quality of the pedestrian ways and understand the walking experience. This has been a chance to identify the key policy changes needed to improve walkability.

We trooped out along with the volunteers and students to survey the walkways. The survey was designed to allow easy participation of students and volunteers. The purpose was to raise awareness and help people make the connection.

Locales were selected to represent residential and commercial land-use classes and also low income neighbourhoods. The pilot bus rapid transit corridor from Ambedkar Nagar to Chirag Delhi has been of special interest as for the first time in Delhi dedicated pedestrian pathway has been built. Connuaght Place is the central business district of Delhi. Interstate Bus Terminus (ISBT) is an important multi-modal interchange point. All India Institute of Medical Sciences (AIIMS) and Safadarjung hospital in its vicinity are sensitive areas. Lajpat Nagar is an important shopping and commercial area in South Delhi. Patparganj in north east Delhi, Chittaranjan Park and Alaknanda in South Delhi are residential areas. Delhi Haat in central Delhi is a recreational area. Nehru Place is another business district. Seelampur Zaffrabad in north-east Delhi, Govindpuri on Guru Ravidas Marg, and Bhakti Vedanta Marg are low income neighbourhoods.

The team audited the walking infrastructure based on a range of criteria related to engineering design, overall environment of the walkways, quality of crosswalks and exposure to traffic. Pedestrian perception survey was also carried out to assess how pedestrians feel about the walking condition. The team has reviewed various methods that are available globally for street audits and ranking and derived an appropriate method for a rapid assessment that can be carried out in a participatory manner with students and volunteers. A review of global best practices has helped to understand the way forward.

WHAT DID WE FIND?

None of the locations has made to the top two ranks: None of the locations surveyed have qualified for the top two ranks of best and very good that truly approach the superlative qualities defined on the basis of global best practices.

These ranks need to reflect the combined best of the engineering features, overall environmental quality and traffic conditions that truly are world class.

Pedestrian lane in BRT corridor is best amongst all surveyed: The dedicated pedestrian path in the pilot corridor of bus rapid transit system between Ambedkarnagar and Chirag Delhi is best amongst all. This has followed proper engineering guidelines and has well surfaced sidewalks. The minimum width has been maintained at 1.5 metre but it goes upto 3.5 meter to 5 meters. The sidewalks are easily negotiable by women and children and senior citizens, as the height is roughly 15 centimeters which is an acceptable benchmark. Sidewalks are disabled friendly, relatively clean, well maintained, and continuous. Access to motorized vehicles has been given to the adjacent land uses without disturbing the gradient of the pedestrian way.

The crosswalk facilities on the corridor are at grade with zebra crossings and pelican signals. The intersections are well designed and paved and the speed tables act as traffic calming measures. The crossings are easily accessible with kerbed ramps. At grade crossings are comfortable for old, disabled and visually impaired.

Yet the BRT pedestrian lane has not made it to the top rank**.** Problems have persisted with its crosswalks. At the time of the survey it has been observed that the pelican signals often do not function especially at the Chirag Delhi intersection and people find it difficult to cross and also the audio facilities are not audible and are not regularly operated. This often increases the waiting time for pedestrians and they tend to jaywalk. This also increases the exposure of pedestrians to traffic. Also basic service facilities on the sidewalks including drinking water, kiosks, shades are inadequate on sidewalks. Also the dedicated pedestrian ways in the corridor are frequently abused by the motorists. These factors have lowered its scores.

Walkways link transport hubs – case of metro and bus station at ISBT: There is a special interest in Inter state bus terminus (ISBT) because it is a multimodal site where both a central bus station and a metro station co-exist. Walkways have a very important role to play in linking the interchange points of different transport systems – bus, trains, metro to allow easy and comfortable dispersion. This distance should be the shortest and the most direct route and walkable. From this perspective the Interstate bus terminus that contains a major bus terminus catering to a large flow of inter state passenger traffic and also a metro to reach out to the central Delhi, is important. The waves of pedestrians increase with offloading at the bus stops. That brings out the close synergy between public transport and pedestrians.

But this site has scored medium. While the metro station and ISBT is directly connected with a path and therefore scores high on that count, the overall access from different directions is highly impeded and distanced. The main road at ISBT does not have at-grade crossing as this has become signal free corridor for the motorized vehicles. Subways and foot-overbridges have become essential. The sheer volume of the traffic at ISBT from the flyovers however compels pedestrians to use the underground crosswalk facility and there is almost no jaywalking at this place. The crosswalks are not disabled friendly. The flyover makes people walk longer distances to access the crosswalk facilities to reach the bus stops on the other side.

However, the integration of the bus station with the metro stations through a walkway that allows people easy access with minimal conflict has helped the location to gain points.

The last mile from the public transport nodes to destinations is the crucial issues that need careful planning. It is essential to connect metro and bus stations with pedestrian networks. Delhi Metro has developed feeder bus service and is planning further enhancement. But pedestrian network is crucial in these locations.

All residential colonies have scored poor: Residential colonies that generate high volume of traffic have dismally poor footpaths. The residential locations surveyed – Alaknanda, Chittaranjan Park and Patparganj – with high pedestrian traffic have scored poor. State of pavements in these residential colonies fall woefully short of the desired benchmark.

The wide footpaths of Patparganj need to be cleaned up and obstructions need to be removed. The situation drastically deteriorates as one approaches the Pandav Nagar and Mother dairy in the vicinity. Pedestrians wriggle their way through the fast moving traffic. Zebra crossings have faded and lead to obstructed sidewalks. There are stretches where there are no footpaths and that too adjacent to a school. The areas demarcated for the pedestrians are unpaved that force people to walk in conflict with the motorized traffic. Curb height of the footpaths are so high that it nearly renders it unusable. The Rules of the Road Regulation 1989 states that where there are no traffic signals and zebra crossings, the first right of way is that of the pedestrians but in practice this is never followed.

Low income neighbourhoods with huge captive pedestrians rank very poor: Ironically, all low income neighbourhoods including Govindpuri, Seelampur and Jaffrabad that have captive and a huge pedestrian traffic have scored very poor. This brings out the equity challenge of urban planning. This population is dependent nearly entirely on public transport or just walking to access jobs and services. It might even be too expensive for these urban poor to use public transport. Estimates show that transport cost for urban poor could be as high as 25 per cent of their income. Equity demands that urban planning takes this imperative into consideration.

Guru Ravidas Marg cutting across Govindpuri market area has footpaths for most of its stretch; but the footpaths are discontinuous, poorly paved and not easily accessible. At places the height of the pavement exceeds 22 centimeters against the accepted norm of 12-15 cm. The width is less than 1.5 meters. The poor signages, lack of pedestrian refuge islands make accessibility and crosswalk an ordeal. There are no kerbed ramps or blended crossings to access the crosswalk facilities. The exposure to traffic is very high. The absence of signalised crossings increase the waiting time period for the pedestrians and there is tremendous jaywalking in this area and the pedestrians cross from wherever they feel like often risking their lives.

In Bhakti Vedanta Marg that connects Nehru place bus terminus with Kalkaji temple, footpaths are discontinuous and exist only on one side at some stretches. The height of the footpath is more than 30 centimeters at places with no ramp facilities to access the crossings and no facilities for the disabled. This force the pedestrians to walk on the roads meant for motorized traffic. The presence of three flyovers in close proximity to the Kalka temple has made this stretch very difficult to cross. The public agency is constructing two foot-overbridges but these structures occupy a lot of space on the sidewalks and little or no circulation space is left for people to walk. The exposure to traffic is high. The situation is acute in Seelampur–Zaffrabad area. The motosrists rarely yield to pedestrians near Zaffrabad bus stop on Atmaram Marg and near Metro station.

Paradox – poor vs elite: To understand the contrast between poor neighbourhoods and the elite localities in Lutyen's Delhi a trip was made to Aurangzeb Road. The irony hits hard. In Govindpuri where about 100 persons walk per five minutes during peak hour has poorly built sidewalks. But in Aurangzeb Road lined with ministerial bunglows, where only 3 persons were seen walking in ten minutes during the morning peak hour, has well designed and spacious footpaths. This shows complete policy disconnect between urban planning and reality of the city. Planning does not keep people in focus.

Commercial areas under severe strain: The central business districts and prominent commercial areas like the Connaught Place and Lajpat Nagar have enormous pedestrian traffic. The assessment shows mixed results. In Connuaght Place, the New Delhi Municipal Coucil (NDMC) has made efforts to improve the pedestrian infrastructure and make the service continuous in many stretches. The improvement in Ram Krishna Mission Marg in the Connaught Place area is noticeable. The Tolstoy crossing has well designed crosswalk facilities with traffic islands that can be used as pedestrian refuge islands. These facilities have kerbed ramps to access the crosswalk facilities. In Janpath, the attractive paving on the sidewalks near the market has created a very congenial pedestrian ambience. Connaught place has wide sidewalks often more than 3 – 4 meters that are easily accessible by all.

But in some places the sidewalks have poor paving especially on the Kasturba Gandhi Marg between British Council Library and the Cannuaght lane. Often wide sidewalks are allowed to have car parking that shrinks the walking area. Also the lighting needs to be improved on these stretches. Though these sites have heavy pedestrian volumes none of them have a disabled friendly infrastructure except at the bus stations. The absence of a sidewalk facility between the Connuaght lane and Scindia House is a problem. The pedestrians are compelled to walk in modal conflict on this stretch.

Lajpatnagar is also a popular shopping area with highly encroached pavements. A small area has been pedestrianised near the market area – about 1.5 kilometers with motorised vehicles being allowed to travel in one direction only. But the pavings are poor and have narrow width.

The policy issue that comes up repeatedly is that the market areas have enormous potential to pedestrianise if adequate infrastructure is provided for. Global experience shows that pedestrianisation improves business in the pedestrianised commercial area as well.

Poorly built footpaths: The stark evidence of neglect of public space is poor engineering design. All city public works and municipal departments follow the guidelines of the Indian Road Congress (IRC) on regulations and control of mixed traffic in urban areas and geometric design standards for urban roads. But these guidelines are outdated and inadequate. For example, there are no clear IRC guidelines on the height though internationally it is accepted that the optimum height should be 15 cm. In many locations very high footpaths have been noticed without proper gradients. Walkers find such pavements difficult to use and begin to walk on the bituminous track. The officials justify this on the grounds that the height helps to prevent illegal parking of motorized vehicles. But compromises on the height cannot be the alibi for poor enforcement of traffic measures. Also in many areas width of the footpaths has been arbitrarily reduced for road widening.

People find at grade sidewalks and crossing most convenient. But increasingly authorities are promoting grade separated facilities — foot over bridges, sky walks and subways as roads are getting wider and wider. As vehicles begin to get priority through seamless signal free roads pedestrians are pushed over and under the roads. People prefer to be at grade and cross with the help of pelican signals. But this is becoming increasingly difficult in main arterial roads where more lanes are being added for motorized traffic. Pedestrians have to cross more than two lanes of motorized vehicles in one direction. This creates extremely hostile and unsafe conditions.

Absence of disabled friendly footpaths: The survey also brings out the stark reality that no thought is given to the disabled while designing footpaths. Narrow uneven sidewalks, high kerbs, steps, make sidewalks unusable for people with impairments. Only in the pedestrian lane in the BRT corridor disable friendly features have been introduced. This issue has also been highlighted with utmost urgency by the Delhi based group Samarthyam that has surveyed some parts of Delhi from the perspective of the disability.

Walkways around hospitals do not address specific needs of ailing visitors: The pedestrian ways around the All India Institute of Medical Sciences that cater to a large number of ailing people visiting the hospital presents a dichotomous situation. The design of the pavements around the hospital has improved according to the guidelines. But the cloverleaf flyover that has been created in its vicinity has disrupted at-grade continuity in its proximity, and increased distances for the ailing visitors approaching the hospital from the side of the Ring road. At least in one direction the vulnerable population has to use the subways. The Ring road has become so wide and heavily motorized that at grade crossing is now nearly impossible. The cloverleaf flyover created to ease continuous flow of traffic has completely severed the connection. Survey brings out that these sensitive areas will require a special focus for designing of the pedestrian walkways – especially in terms of keeping the direct routes from all access points at grade. If subways become absolutely essential in vicinity of the hospitals it is important to make them hundred per cent handicap friendly with supportive tools.

Severance of cityscape: It is not often understood how car centric infrastructure – flyovers and cloverleafs completely severe neighbourhoods and increase distances. This is starkly evident in AIIMS area where a cloverleaf flyover has been constructed. The sides are not easily accessible through direct shortest route. In fact the assessment shows that walk across from AIIMS to Delhi Haat now takes longer time through circuitous routes cutting across unfriendly passes and subways.

Shrinking space and jay walking: Most sidewalks are severely obstructed. Both temporary and permanent obstructions. Spaces have also been taken up by the illegal and unplanned markets and hawkers. This is a serious problem. As the direct and at-grade crossing is blocked by the barricades for motorized traffic, often people are seen jay walking. This has also brought forth the concern over the road designs that make routes longer and difficult for pedestrians. This is leading to forced jaywalking and compromising safety.

Pedestrian space surrendered to vehicles: Clearly, cars are taking over the legitimate space of walkers. Parking of vehicles on footpaths have become chronic. Parked cars are taking away nearly the entire walk space and forcing people to walk on roads in sheer modal conflict. As there is no priority accorded to pedestrian, authorities do not care to enforce laws to prevent motorized traffic from filtering

into the walkways. This is rampant even in the dedicated pedestrian way on the BRT corridor. Vehicles are entering the forbidden zone with impunity compromising the integrity of the system.

Walking in modal conflict with motorized traffic: Nearly in all sites pedestrians are being forced to walk in total modal conflict with motorized traffic increasing risk of accidents. Nehru place has high modal conflict due to inaccessible sidewalks and discontinuous footpaths and also the motorists do not yield to pedestrians.

Poor environment for walking. User survey expose disenchantment: The user opinion survey was carried out in selected locations along with the third party assessment done by the CSE and its volunteers. User survey brings out clearly how dissatisfied the pedestrians are in most of the locations under survey. The main points of complaints include uneven surface, potholes, urinals, height of the pavement that make them walk on the road. Interestingly, sometime pedestrians have rated some locations better than the third party inspection by CSE because they are so used to the state of affairs that they are not conscious of demanding anything better. However, pedestrians on the BRT lane are very happy with the sidewalks and have commented how their daily drudgery of walking has changed because of the improvement. But they are not very satisfied with the cross walk facilities as the signals are not working properly.

WHITHER POLICY?

Increasingly, it is being asked if cities should find legal solution to the policy disdain that leads to neglect of walkers. Should cities legislate right to walk?

Lack of cohesive legal framework for effective action in cities: It might surprise many but India does have a plethora of laws and bye laws related to road safety, road infrastructure, pedestrian protection, and urban planning that have bearing on pedestrians. But laws are fragmented and do not add up to an integrated framework to promote pedestrianisation or protect pedestrians and pedestrian rights with any degree of stringency.

Policies have begun to evolve at both national and city levels. The national framework is outlined by the National Urban Transport Policy of the Union ministry of urban development that has incorporated the principle that pedestrians and pedestrian infrastructure need special focus in transport planning as these are environment friendly and cause zero pollution. The guidelines of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) do not make explicit reference to predestrian infrastructure. But all cities with more than a million population that are covered under JNNURM are required to develop their respective city development plans to identify the infrastructure projects that can be eligible for central and state assistance. A cursory review of the CDPs of some cities shows that pedestrian infrastructure is being planned as part of the overall road infrastructure. This helps to channelise funding. CDPs however need to move beyond footpaths along motorized corridors to a larger vision for pedestrianisation in cities linked with public transport. National mandate can help to catalyse city based action.

This programme can be leveraged to give priority to construction of cycle tracks, pedestrian walkways and pedestrianisation. The Union ministry of urban development has issued policy circulars and advisories in 2007 asking for Comprehensive Mobility Plan with focus on mobility of people and priority to

pedestrianisation and public transport.

A range of rules and guidlines converge at the city level but its implementation remains uncoordinated and ineffective. There are rules for motorist under the Central Motor Vehicles Act to prevent them from causing accidents and harm to pedestrians. This Act even bars motorists from entering pedestrian space but this is rarely enforced. Motorists are liable to punishable offence, yet it is not enforced as a strong enough deterrent. Existing engineering guidelines from the Indian Road congress are inadequate and do not meet the full range of pedestrian needs. Master plans have begun to include provisions for pedestrian protection and pedestrianisation. But these provisions run parallel to the priority accorded to planning for extensive car centric infrastructure. Similarly, rules exist to prevent obstruction of public spaces, planned placement of hawkers and street vendors, regulate pedestrian and vehicular movement. Under Delhi Police Act even penalty can be imposed on jaywalking. But these rules are not implemented in an integrated way or effectively.

Relevant laws will have to be harmonised and combined with more direct legal protection of pedestrian space and rights. Experience from round the world shows that the legal framework evolves through a series of executive orders targeting several aspects of pedestrianisation. Increasingly laws are providing for captive use of zones for pedestrians, improvement of overall environment of the streetscape, laws targeting traffic calming measures, restriction of traffic flow in targeted areas, and laws related to pedestrian safety. But Indian laws lack this integrated approach and even the policy conviction that pedestrianisation will require strong legal back up and enforcement strategies.

People are not included in decisions that affect pedestrian space: When large projects on road infrastructure including road widening, flyovers and road elevation are planned in a city there is no provision of environment impact assessment (EIA) or public hearing. Even the municipal laws do not require consultation with the local residents in cities. EIA is required only for highways more than 30km and that need land acquisition for road widening of more than 20 meter. Therefore, in a city pedestrians do not count in the decision on walk space.

Even with the plethora of laws and regulations pedestrian space cannot be protected legally. Laws cannot prevent usurpation of walking space. Walking space can be easily sacrifised without any question raised. Such erosion of pedestrian space does not lead to any penalty on the city developers and planners. The rules do not demand accountability on part of the municipal and development agencies.

It is also very clear from the actual practice that rules will remain ineffective if pedestrians are not accorded priority. This will require significant shift in policy attitude.

WHAT OTHER GOVERNMENTS ARE DOING?

The pedestrian movement in other regions of the world has gone much beyond only footpath development for safe and comfortable passage. The movement is heralding in an entirely new ethos of urbanity to reduce automobile dependence. Global experience shows that initially the focus was to reduce traffic in busy city centres and shopping areas. Any policy focused on pedestrians has to take cognizance of the layers of issues that it needs to address. Globally, this is being done through a hierarchy of interventions.

Setting legal framework for change: The UK has come up with one of the most comprehensive Road Users Act that lays down rules regarding Quiet lanes and Home zones and pedestrian zone. Such legislations deal with all road users - motorised and non–motorised traffic in an integrated manner. The Quiet Lanes and Home Zone Regulations 2006 detail out the provisions. London has worked out a range of walking improvement strategies.

The London Road Traffic Reduction Act 1997 gives guidance to local traffic authorities on the fact that in some urban areas the existing volume of traffic may be such as to prevent further traffic growth during the peak and other periods. In such cases local authorities might adapt their measures of traffic, disaggregated by time of day. Authorities may set local targets that might be expressed in terms of increasing vehicle occupancy or increasing use of other modes of transport. Local authorities may want to reduce traffic levels or their rate of growth in a particular area to make roads safer, improve the local environment, reduce congestion, benefit the local economy or improve air quality.

The Act gives local authorities in London the flexibility to take the needs of all parts of their area into account when deciding the targets. An authority may choose, therefore, to set: -- A single traffic reduction target for their area, relating to all classes of vehicles and to all times of day; a target relating to a particular class of traffic, eg cars or heavy vehicles; a target relating to a particular time of day, eg peak hours; a target relating to a particular part of their area; a target relating to particular types of traffic, eg commuter traffic or journeys to school; a target relating either to existing traffic levels or to their rate of growth; seasonal targets; any combination of the above.

Even in the US some states have become more proactive about pedestrian environment. San Francisco for instance has created Better Street Policy. These focus on walking access to and from the site; assessment of land use to see walking is generated; capacity and quality of the local network, opportunities and requirements for improvement; inclusion of walking in the transport planning; Traffic Impact Assessment of the development; inclusion of measures in the Travel Plan for the development to maximize walking to and from the site; Procedures for funding, monitoring, and enforcement; Planning conditions relating to walking; Policy criteria for adoptable spaces and public rights of way; Mechanisms for ongoing maintenance of areas accessible to the public. New York city is also promoting pedestrian infrastructure.

We have begun to see expicit executive orders and legislations that address pedestrians. For instace, in Auckland The Land Tranport (Road Users) Rule 2004 states that a driver must not drive a motor vehicle along a footpath; must not stop, stand, or park the vehicle on a footpath or on a cycle path; a driver entering or exiting a driveway must give way to pedestrians on a footpath. A driver or person in charge of a vehicle must not stop, stand, or park the vehicle on a pedestrian crossing and so on.

Improve engineering, and environmental features of pedestrian ways: The first step in most cities is to address the walkways to make walking comfortable and safe and improve the direct access routes to reduce dependence on motorized traffic for shorter trips. This is the first step towards the larger expansion of pedestrian zone to minimize motorized traffic in targeted city centres. They are also working towards composite environmental enhancement of the streetscape. Well maintained, obstruction free, clean and attractive walkable spaces.

Measures to calm traffic: A range of measures are being implemented in American and European cities to calm traffic and increase the degree of safety. These include speed restrictions, speed humps, pedestrian refuges to hold people in the median, textured and coloured pavements that the motorists should avoid, traffic circles in the intersections to force motorists not to speed and avoid the pedestrian areas. According to Lloyd Wright the purpose of these is to give both physical and psychological priority to pedestrians. These are largely self enforcing. But this would also require careful evaluation as some of these measures like traffic circle at the intersections may make pedestrian crossing more unsafe as there is continuous flow of traffic. Raised pavements that are made to make pedestrians more visible to the motorists, may be inconvenient to the pedestrians and they may resort to walk at grade on the roads itself.

Some of the well known global experiments include the "Woonerf" experiment in Netherlands that catalysed and spread traffic calming measures like speed bumps, trees, S shaped curves, etc. Following that many neighbourhood projects came up in Germany and other parts of Europe.

Smart growth approaches and home zones: In many US and European cities efforts are being made to counter sprawl through mixed land-use and high density development. To be able to do this they are creating housing opportunities with walkable neighbourhoods. This is enforced with traffic calming measures in the neighbourhoods or home zones as in the United Kingdom (UK). In these approaches car traffic is not eliminated but lightened. There are instances in the UK where parking of cars are being removed from the buildings and being taken farther than the bus stops. Therefore, people have to walk longer to get into their cars than to the bus stops. This discouraged motorized traffic in the neighbourhood and also overall in the city.

Car free centres and car free housing: European experience shows that there are a few rare instances of car free cities. A few notable historical cities that include Venice in Italy, Capri in Italy, Zermatt in Switzerland, and Louvain la Neuve in Belgium are the only instances that are essentially car free within the city boundaries. Points out Wright that Venice, Capri, and Zermatt are also notable for world's highest residential property values and thus indicating that car free location can in fact bolster economic value. Some island cities such as Landau in Hong Kong, Fire Island in the US, Buyukada in Turkey, Capri, could become car free primarily because of the difficulty in developing car infrastructure, densities and journey distances.

However, in other cities targeted areas are kept car free which is also part of the movement to improve urbanity and reduce pollution and congestion. The most common approaches are car free shopping streets. Some global examples are Kaufingerstrafe in Munich, Nanjing Road in Shanghai. These are said to have worlds' highest pedestrian volumes. Kaufingerstrafe as recorded volumes over 15,000 pedestrians per hour, and 200,000 pedestrians per day. Copenhagen has done extensive pedestrianisation. London's Covent Garden is another example. Zurich and Oxford streets are examples of pedestrianisation that allow public transport in the area. This trend is also catching up in developing country cities. Buenos Aires, Curitiba, Sai Paolo, Shanghai have all begun to create car free shopping streets.
There are quite a few car-free housing schemes development schemes across Europe that give priority to pedestrians and alternative modes of transport.

Studies have shown that pedestriansation of shopping areas actually has positive effect on sales. Transport experts are even estimating how car free development

will create more job opportunities. Estimates show that investments in public transit can create more jobs per every USD 1 million of investments as opposed to the same in general automobile manufacture and petroleum – 21.4 for public transit vs 7.5 for automobile.

Car free days: A number of cities across the world have begun to observe car free days. This symbolic gesture is gathering ground. The car free day concept is not merely not one of limiting traffic in certain streets, but also of enabling city dwellers to discover other means of transport.

Cities even assess the impact of these days on urban environment. French air quality monitoring agency have shown how air quality becomes "satisfactory" after only clean fuel and public transport are allowed in the city centres on a car free day. In central Paris levels carbon monoxide fell 30 per cent and nitrogen dioxide by 15 percent. Opinion surveys carried out in France and Germany have shown overwhelming support for these events. In October 2000, people of Bogota voted positively for a referendum that asked them whether they wanted all cars off the streets every weekday in morning and evening peak hours from January 2015 onwards.

Moreover, many cities globally including San Franciso, Milwaukee, Portland, Toronto, Seoul, New York have destroyed roadways to create public spaces. There are excellent high quality public spaces in Hong Kong, Singapore and Tokyo.

THE WAY AHEAD

A growing number of cities round the world have begun to look at the whole new way of living in cities, and designing roads and public spaces to move more people than vehicles. Only traffic considerations cannot rule the decisions on movement network planning in cities. Diverse concerns including pollution, congestion, energy and climate impacts have converged to push decision on city and road network planning.

Road engineering interventions once made cannot be changed easily but it will permanently decide the design of the network and influence travel choices of people. It is imperative to ensure that road design does not increase dependence on and usage of personal vehicles. That is possible only if cities are built on the basis of public transport, walking and cycling. The current movement network of people should be continuous, enhanced and not disrupted.

If infrastructure development centres around motorized traffic it will require engineering interventions to keep the traffic moving through signal free intersections, grade separation, road elevation and express ways. This will severe landscape, increase walking and crossing distances and waiting time at the crossing, and impede easy access to public transport nodes. This will also increasingly convert short walkable trips to motorized trips. This will further encourage shifting to motorized traffic. We have already begun to notice these changes in our cities. This runs the risk of increasing pollution, congestion and energy guzzling.

City planners need to appreciate that walking is the most basic and pervasive amongst all modes of transfers and that's the way all travel trips originate. Effective multi-modal integration requires the most efficient pedestrian network to ensure that mass of people can move through the transportation network with ease. If pedestrian traffic is compromised public transport usage will deteriorate to sub-

optimal level. Shorter walking trips will steadily convert to motorized trips. Reorganisation of urban space to make it more closely knit and walkable is the pre-condition to promoting sustainable modes.

Getting good walk ways is only the first step towards creating non-motorised space in our cities. That is the way other countries have begun to move. As cities begin to scale up public transport systems efficient pedestrian network will become necessary to allow mass of people to move through the public transport network with ease. If pedestrian traffic is compromised public transport usage will deteriorate to sub-optimal level. Reorganisation of urban space to make it more closely knit and walkable is the pre-condition to promoting sustainable modes.

The change needs vision. Cities will have to be built keeping the last mile in mind. Redesign cities to bring services, jobs, homes closer to enable shorter and walkable trips. Improve engineering and environment of walkways to make walking comfortable and enjoyable and stop motorizing the short trips. Identify key areas in cities that can be freed from motorized traffic to allow the freedom of walking and cycling. The agenda goes much beyond footpath design to include a whole new way of living in cities.

AGENDA FOR ACTION

Harmonise existing laws: Urgent steps are needed to harmonise laws and policies at the national and the city level for effective implementation. For instance, JNNURM programme of the Union ministry of urban development provides the mandate and resources to cities and includes provision for pedestrian infrastructure in cities; City Master Plans as in Delhi provide the template for urban planning and pedestrian space; municipal laws have rules to protect and maintain pedestrian space; motor vehicle laws lays down safety rules; Police laws can enforce penalty and compliance strategies; and state laws are expected to protect pedestrian rights. But cities need an effective unified legal framework for effective enforcement.

Pedestrian governance will continue to have decentralised framework as most policy action will take place at the city levels. But both Union and state governments will have to take responsibility to create a more unified legal framework for effective implementation.

Legislate to protect right to walk: Indian cities need a comprehensive road users act. The state governments in consultation with the union government should initiate a process for enactment of a legislation that will comprehensively address targeted pedestrianisation, mandatory implementation of important engineering guidelines for walkways, traffic volume reduction measures, improvement of street scape, maintaining the integrity of the pedestrian pathways and strongly enforcing penalty on motorized vehicles for encroaching into pedestrian space and so on.

Conversion and acquisition of pedestrian space for motorised traffic should not be allowed without public hearing and proper justification. During construction or laying down of utilities it is necessary that the pedestrians be notified of the inconvenience and separate diversion route plans prepared and implemented to cause minimal inconvenience to them. It should have composite service planning in the pedestrian space, ensure continuous connectivity and easy and safe crossings. Bind it all together to protect the pedestrian rights.

The Law commission of India in its consultation paper on "Legal Reforms to combat Road accidents" in 2008 proposes that the state governments in consultation with the union government initiate a process for enactment of a traffic management and regulation act that would also include the legal rights and duties of pedestrians and bicycles and also govern their behaviour on roads and that of other motor vehicles. Well planned facilities and infrastructure should be an integral feature of all urban roads. It states, "There is no central legislation comprehensively governing/ regulating the use of roads by the pedestrians and non-motorized traffic. It is left to the States to legislate thereon."

This concern has come to forefront especially in those cities that are implementing segregation of space for road users as part of the bus rapid transit system. City officials in Delhi have asked if there is need for separate legislation to lay down the rights and obligations of all road users for better management of the segregated space. An Act should lay down the guidelines on pedestrian movement and specify who should have the right of way, and what should be the acceptable crossing time for pedestrians at the traffic signals at intersections and effectively regulate volume of traffic. It is time to evaluate the possibility of a comprehensive legislation to enable effective action.

Pedestrian plans should be made mandatory and conditional to infrastructure funding in cities: Effective action is possible if pedestrian plans are made mandatory and conditional to accessing funds for infrastructure development in cities. The framework of the national urban transport policy and the investments for city development under the JNNURM programme need to be linked with mandatory pedestrian plans in cities. CDP is already an instrument to prioritise funding. This will also help to leverage state government spending on infrastructure and move local action. There is one such instance in Nanded in Maharashtra where major remake of pedestrian ways has been possible as its CDP has proposed pedestrian improvement. Building a good footpath is only a step towards freeing urban space from motorized transport to reduce congestion, pollution and fuel guzzling. City authorities need to earmark shopping zones, central business districts, places of tourists attraction, heritage places, and even residential areas that can be freed from personal motorized vehicles. This can be combined with non-motorised transport to make services, education and job facilities walkable within neighbourhoods and also within short distance ranges.

Additionally, the mobility plans that cities are reqired to prepare under the guidelines of the National Urban Transport Policy must also include explicit pedestrian plans. The plan should clearly identify ways to pedestrianise, improve the engineering variables, environmental and service conditions of the pedestrian infrastructure, continuous walkpath at interchange points to allow multi-modal integration. The city agencies must identify funding source, devise a funding mechanism that would ensure regular flow of money to the local authorities. Central support for the BRT projects that is based on the principle of segregation of road users will be an opportunity to create a network of pedestrian infrastructure.

Mandate reformed guidelines on engineering, environmental, safety and aesthetic aspects of walkways and make them non-negotiable: The civic and road building agencies in cities largely follow the guidlines laid down by the India Road Congress. In addition to this the Urban Development Plans Formulation and Implementation (UDPFI) that functions under the aegis of the Union ministry of urban development and also lays down guidelines.

The current IRC guidelines include guidelines for pedestrian ways but they are old

and do not reflect the newer concerns. For instance, the current IRC guidelines are not adequately explicit on the requirements regarding the height of the footpaths. Guidelines are also weak on dipped kerbs and gradients, pedestrian refuge and types. There are also no guidelines on the timing of the signals from the pedestrian perspective or the right of way for pedestrians at non-signal controlled zebra crossing.

The current guidelines need urgent revision to improve accessibility and safety, to make walkways walkable, comfortable and disable friendly, enhance aesthetics and ecological regeneration of the public space. Geometry of roads and walkways will have to reflect the needs of bus users, pedestrians, and fulfill the service needs. Design must allow the pedestrians to remain at grade with comfortable and safe access. The overall road design should allow pedestrians to have the most direct route. Some universal design measures must be laid down and must be adhered to.

It is equally important to design guidelines according to landuse and estimated pedestrian volume. Implementation of guidelines should be made mandatory and non-negotiable.

Delhi has an opportunity to move ahead as it has a dedicated body – Unified Traffic and Transportation Infrastructure (Planning and Engineering) Centre (UTTIPEC) in DDA and under the aegis of the Lt Governor of Delhi. UTTIPEC is in the process of finalising the guildelines for pedestrian infrastructure in Delhi.

This will not be an easy transition. As roads are being designed increasingly for motorists pedestrians are being pushed to foot-over bridges or subways that are not convenient for them. Pedestrian network needs to remain continuous and connected, and at grade. If separated by heavy traffic roads appropriate and safe surface level crossings should be provided. As much as possible grade separated structure should be avoided to prevent unnecessary detours to reach destinations. The placement of bollards and signages should also be specified. Space will have to be planned for hawkers and utilities including drinking water kiosks and toilets so that the walking space is enhanced but not compromised. Design of refuge islands needs to be planned well with adequate width.

Moreover, the level of services in terms of shade, trees, and drinking water services are very poor. Cross walks facilities are so inadequate that it makes pedestrian crossing very unsafe. There is not enough holding area in the median to accommodate the walkers. Overall environment of the footpaths is very poor. Cities need composite streetscape planning to enhance walkability, safety and urbanity.

The most critical aspect of the design is to include design features that are disable friendly. All sidewalks should have floor tactile tiles to guide vision impaired persons. Auditory signals are equally important. Equally important is the ecological enhancement of the walkways.

Moreover, while laying down utilities or during construction of mass transit it is always the pedestrians and bus commuters who suffer. IRC guideline for Utility (IRC-98-1997), recommends underground utility beneath the footpaths. This leads to frequent disruption. This needs urgent revision. Enough space should be kept for laying down utilities and safeguards built in to prevent disruption of route.

Implement walkability and safety audits: Massive investments are being mobilised for road building and transport infrastructure in cities under the JNNURM and state

government programmes. But quality control in construction of footpaths and pedestrian ways is turning out to be a serious bottleneck. The new investment will have to be linked to strict quality control and stringent implementation of the reformed guidelines on pedestrian ways.

Poor maintenance can be as much a contributor to poor quality environment as sub-standard design. The local authority will have to establish criteria and benchmarks for walkability audits and supervise and monitor pedestrian infrastructure based on benchmarks. This will also require supervision of contractors and developers. Standards of street maintenance and cleanliness are necessary for enhancing the pedestrian environment. It is important to take maintenance issues into account when negotiating the design of streets and spaces. The expense of good designs and high quality materials will be wasted unless full maintenance can be assured. This might militate against the use of non-standard surfaces, for example, for which there may be no ready access to replacement materials. Also the likelihood of subsequent street openings for utility repairs should be assessed. If possible, major street improvements should be accompanied by replacement of obsolescent sub-surface utility infrastructure, if necessary with costs apportioned appropriately to the utility companies.

- **Road safety audits are carried out for World Bank funded highway projects. Adapt them for urban roads as well:** Currently, road safety audits are conducted for new highway projects. This is carried out in five stages --- preliminary design stage; post completion of preliminary design; detailed engineering design on a per km basis; construction stage; and pre-opening stage. These audits are caried out by the agencies like Central Road Research Institute (CRRI) and National Highway Authority of India. CRRI has prepared road safety manual in 2002 under the aegis of the Union ministry of road transport, shipping and highways. This is being updated now. CRRI has also prepared a eleven point road safety policy. It is important to adapt similar system for all hierarchy of urban roads in cities.

- **Approval and clearance of all road projects should make adherence to pedestrian guidelines mandatory:** Concerned agencies in cities such as Unified Traffic and Transporation Planning and Engineering (UTTIPEC) and Delhi Urban Arts Commission (DUAC) in Delhi, must make it legally binding for the road construction agencies to meet all the stipulated guidelines. This should be made the basis of approving road projects. The guiding principle has to prioritise the provision of pedestrian, cycling and public transport infrastructure. For this purpose the approving agencies will have to standardise formats for submission of project details and and make it available for public scrutiny.

Public transport plan needs linkage with pedestrian plan: Cities like Delhi have begun to implement mass transport systems. With right policies this should see a massive increase in pedestrian volume. Pedestrian ways will also play an important role in multi-modal integration. This will be a crucial link between the metro system and bus rapid transit systems evolving in Delhi and other cities. Management of the last mile that is mostly a walk trip facilitates transfers from origin to public transport nodes. Delhi has witnessed conscious development of dedicated pedestrian ways only with the evolution of the BRT system. Without such facilities public transport systems will function at a sub-optimal level.

Need zero tolerance policy for accidents: Mobility network needs to be built in a way that people are able to move around cities freely without the risks of accidents. It is the responsibility of society and the governments to protect them. Fatalities

and injuries from road accidents is unusually and unacceptably high in Indian cities. There are substantial costs associated with accidents. The responsibilities of the urban planners is to design safe environments for pedestrians. Traffic and people do not mix. The future urban road guidelines will have to provide for dedicated pedestrians ways along arterial roads and at interchange points. Points out David Banister, transportation expert from Oxford university, "In the EU there has been a huge move towards reducing accident rates through a variety of measures such as slowing traffic down, separation of vulnerable people from motorised traffic, through education, and through having more pedestrian crossings and fines for violation of pedestrian space. Sweden in fact has zero road fatality policy."

Commonwealth Games is an opportunity for Delhi to rebuild pedestrian space: Massive investments have been earmarked for the Commonwealth Games 2010 in Delhi. Money earmarked for road infrastructure is enormous. But this also demands that the fundamental principles of the road design will have to attach primacy to pedestrians and public transport. Delhi Development Authority is currently revising the guidelines for urban roads and pedestrian infrastructure. This should address this critical need.

Need special focus on small and medium towns for pedestrian infrastructure: Small and medium towns where the problems of mobility have just begun to manifest must make these interventions during the early stages of development and growth. The Union ministry of urban development has a national programme on Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT). The schemes that are permissible under this programme include construction/upgradation of roads, and highways/expressways. It is important to make explicit provisions for pedestrian infrastructure in these towns. Pedestrian plan should be made mandatory in these towns. Pedestrian and bicyclist facilities should be designed along all roads and intersections. Designing of such infrastructure should also integrate the needs of the handicapped and the disabled.

Involve pedestrians in decision making on use of roadspace: The current regime cannot protect pedestrian space if it is taken away from the walkers to make way for road widening and road elevation to meet the needs of motorized traffic. Pedestrians are not included in these decisions. Municipal and development agencies are not held liable if the engineering guidelines for footpaths are not adhered to; if disable friendly designs are violated, arbitrary decisions on grade separated pedestrian ways are not prevented. Authorities are not made accountable. Environmental impact of major urban road development projects should be assessed. Pedestrianisation should be included in the pollution and congestion mitigation strategies.

Implement measures to reduce traffic volumes and traffic calming measures: Pedestrianisation cannot work if the modal conflict between pedestrians and motorized traffic cannot be minimized. Only this can enhance safety and walkability. Also city authorities should have powers to reduce traffic volume in targeted areas at peak time.

Already, in most arterial roads in Delhi the volume of traffic has exceeded the designed capacity of the roads. This inadvertently qualifies important arterial roads for uncontrolled grade separation and elevation if uncontrolled increase in traffic volume is assumed. That is not sustainable. Therefore, policies will also have to simultaneously provide for traffic volume reduction plans.
As we have seen earlier London Road Traffic Reduction Act 1997 authorises local

traffic authorities to prevent further traffic growth during the peak and other periods. Authorities can set local targets that might need increasing vehicle occupancy or increasing use of other modes of transport. The Act gives local authorities in London the power to set targets for traffic volume reduction in an area etc.

Indian civic authorities also need to work on traffic volume reduction and calming measure, enhancement of pedestrian environment, restraints on use of automobiles and conversion of the motorised trips to non motorised and public transit trips. They should take stock of the trips demand in the area and work on strategies to increase modal share for walking, use of non – motorised transport and public transit. They should prepare a road map with targets and associate it with reduction in pollution levels.

Only legal back up and design guidelines cannot help. Need change in attitude: The urban local bodies and road building agencies will have to accept that the best way to change is to create more public transport and walking oriented movement network. Policies will have to attach priority to pedestrians, cycling and public transport. It is also important to separate people from traffic and respect non-motorised public space. There has to be social pressure to lower levels of vehicle speeds and accidents. This needs change in policy mindset.

If the infrastructure design gives priority to public transport, pedestrians and cycling the mobility paradigm can be transformed and made more sustainable. JNNURM strategy in public transport, mission on sustainable habitat that outlines the public transport strategy under the National climate action plan and the interventions that have been planned in various cities as part of clean air and mobility and development plans will see massive mobilization of investments in the near future. It is important to influence this investment with right policies and priority. It is possible for these cities to have people centric focus while moving to higher quality of public transport and an urban way of life that is dominated by walking and cycling.

— Right To Clean Air Campaign Team

Right to walk is non-negotiable

1. FOOTFALLS

Everyone walks. Walking is the most basic and pervasive amongst all modes of transfers and that's the way all travel trips originate. Walking is fully non-motorized. Yet, this is the most neglected part of urban planning. Everyone walks but the space for walking and the network of footpaths are constantly shrinking to become the faintest stroke on the planners map.

It is not easy to assess the trend in walking trips in Indian cities because of data limitations. There is very little organized data on pedestrian volumes in cities as there is no formal officials mechanism to track and count pedestrians on a regular basis in Indian cities. Only small *ad hoc* surveys carried out by independent agencies for specific studies or infrastructure projects help to generate some indicative data.

According to the experts of Transport Planning Transportation Research and Injury prevention Programme (TRIPPS) of the Indian Institute of Technology, Delhi (IIT Delhi) the first ever estimates for walking trips are available for the year 1994 whereas for other modes it is possible to estimate the trend since the 1950s. This clearly shows walking mode was never given any importance in the planning of cities. The first ever estimates available for the year 1994 shows that walking formed as much as 32 percent of all trips in Delhi.

Normally, such counting is possible only if detailed surveys of households are conducted in each city, but this is rarely done. The most recent national survey covering 30 cities has been carried out by the US consultancy Wilbur Smith Associates for the Union ministry of urban development in 2008 on traffic and transportation policies and strategies in urban areas in India. This has brought out the enormity of this mobility. Nationally, the range varies between a low of 16 per cent to high of 57 per cent (See Table 1: *Modal share of walking in key cities of India*). This means in many cities more than half of all trips are walking trips.

Table 1: Modal share of walking in key cities of India

Cities classified according to population	Percentage walking
< 5 lakh population (plain terrain)	34
< 5 lakh population (hill terrain)	57
5- 10 lakh poplutation	32
10-20 lakh population	24
20-40 lakh population	25
40-80 lakh population	25
> 80 lakh population	22
National	28

Source: Anon, 2008, Study on traffic and transportation policies and strategies in urban areas in India, Wilbur Smith Associates, for Union Ministry of Urban Development, May, New Delhi

The size of the city influences magnitude of walking. Smaller cities and especially cities on the hills have a very high share of walk trips. Their compact size, dense core, greater accessibility and relatively lower number of motorized vehicles make the smaller cities immensely walkable.

The share of walk trips in bigger cities that have more than 10 million people is also very substantial. This has been borne out by various studies. Mumbai has more walkers than Delhi – 43 per cent, according to a 2005 study by the World Bank – about four times the number of people using private vehicles. Another survey from 2005-08, by the Mumbai Metrolpolitan Region Development Authority estimated the number at 52 per cent. In Ahmedabad, cycling and walking constitute 54 percent of all trips, estimates a report of the Centre for Environment Planning and Technology. Bangalore records 26 percent, Chennai around 27 percent.

Walking share is very high in small cities. It varies between 25 per cent to 57 percent in small city class with less than 10 million population. A 2009 study carried out for Union ministry of urban development shows in a small city like Jalandhar the share of non-motorized trips (pedestrian and cycling) is much higher than bus and mini bus trips even today.

The count of walk trips in fact will increase further if the estimates also include public transport trips; each public transport user is a walker atleast four times a day. The Wilbur Smith report shows that Kolkata ranks very low in terms of pedestrian share (19 percent only) but this looks inconsistent as this city also has the highest public transport share (54 percent). This does not account for the fact that all public transit riders are pedestrians at least four times a day while they board and alight from the public transit.

Any attempt to augment public transport and increase its usage will lead to correspondent increase in walking. Public transport is primarily accessed through walking. RITES survey in Delhi has brought out 61 per cent of the trips from origin to metro and 78 per cent from metro to destination are walk trips. This means even 50 per cent increase in kilometer traveled by public transport would lead to massive increases in the quantum of walking. Roads will have to be planned with more holding areas. Therefore, the city has to plan the pedestrian infrastructure to cater to the present and future demand for walking in the city.

Even 50 per cent increase in kilometer traveled by public transport would lead to massive increases in the quantum of walking.

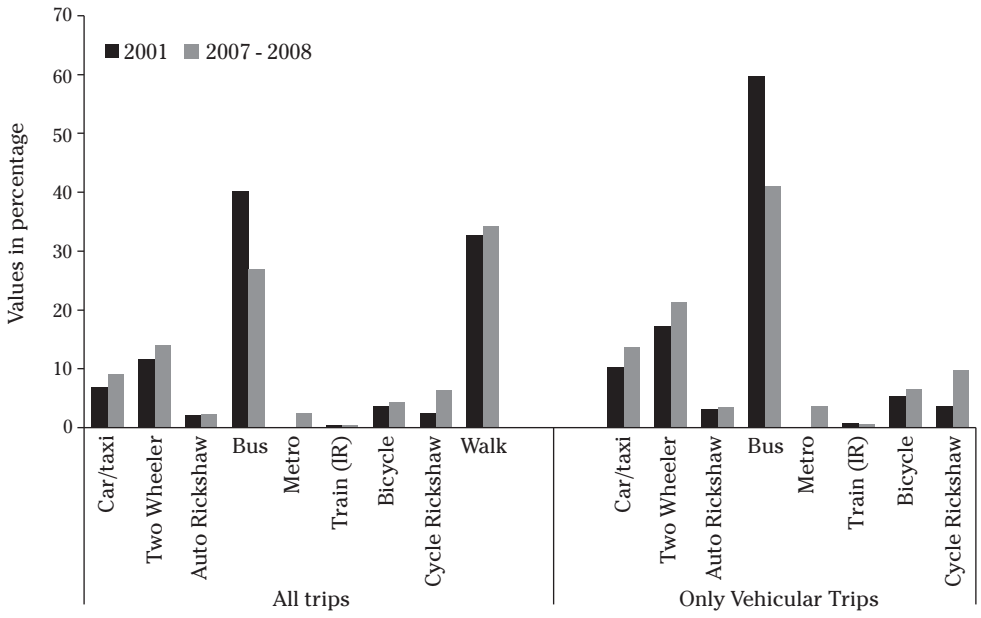
Even in car crazed Delhi the number of walk trips has remained high overtime. The capital city of Delhi shows very high share of walking trips. New Delhi based RITES has done a survey of about 45,000 samples in Delhi in 2008. It shows much higher share as many as 34 percent of the trips are walk trips than the Wilbur Smith estimates of 21 percent. Though these estimates vary due to the differences in methodologies, the share of walking is still very substantial. It is astounding that one third of the travel trips in India's Capital are walk trips.

The RITES study also shows that the share of the walk trips are not only substantial at 34 per cent, it has even increased a little from the 2001 levels of 33 per cent. Informs RITES out of 23 million daily trips 8 million are walk trips. This has been possible even when bus ridership has declined in Delhi from 60 per cent to 43 per cent during this decade in the city (Graph 1: *Changing modal share in Delhi*). This shows captive walkers is high and increasing perhaps with influx of more poor people into the city. Walkers outnumber those using vehicles in most Indian cities.

Planning for road infrastructure however does not take into account the needs of the pedestrian traffic. Increasingly, flyovers, expressways and elevated roads are

Congestion imposes high cost on urban communities. More than half of Indian cities are polluted.

Graph 1: Changing modal share in Delhi



Source: RITES, 2008

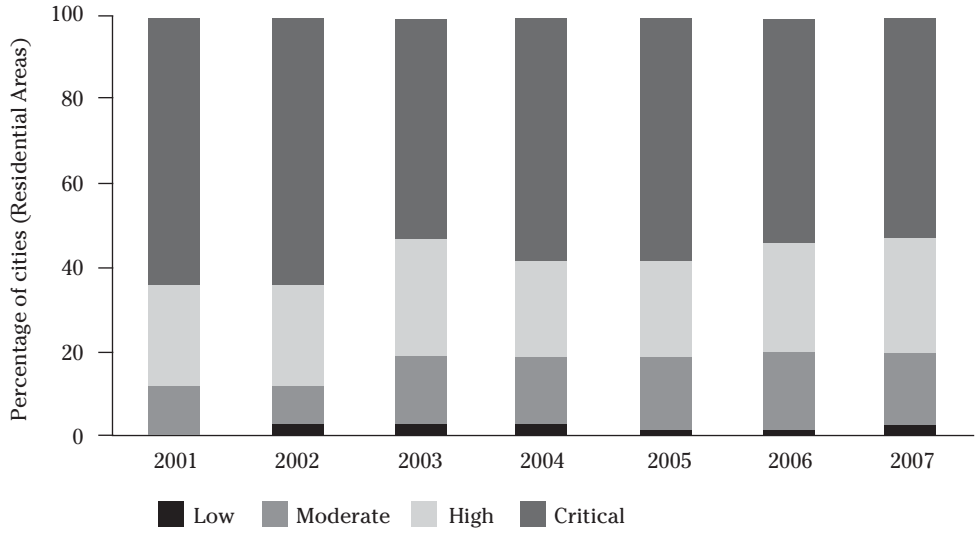
being planned. This is disrupting the walkways. As roads are getting wider road building agencies like Public Works Department in Delhi are planning numerous foot overbridges. Their assumption is that these are being built largely on arterial and sub-arterial roads where people walk only to reach a bus stop. So their responsibility ends with providing foot overbridge that connects a bus stop. But they lose sight of the fact that these foot overbridges increase the walking distances at least by three to five times compared to at-grade facilities. It violates the principle that people and public transport have to remain at grade, if at all it is the motorised vehicles that should go over or under. Flyovers and foot over bridges should not be treated as independent infrastructure projects but be an integral part of the community mobility plan of the city.

Cities will have to make a choice now. Mobility crisis — congestion, crawling traffic and high pollution levels — has paralyzed cities. In many Indian cities congestion now occurs for longer portion of the day, cause inordinate delays that affect more people and goods then ever before. Congestion imposes high costs on urban communities – it can be as high as 2 - 3 per cent of the GDP. More than half of the cities are critically polluted in India (Graph 2: *More than half of cities have critical pollution levels*). This will get a lot worse if vehicle numbers continue to increase, more commuters shift to personal vehicles, and transport infrastructure is planned mainly for cars.

New studies have begun to emerge that shows that bigger Indian cities with high motorization levels are plagued with the problem of equally high level of local air pollution and also carbon-dioxide levels that is directly linked with fuel consumption. A recent study carried out by the Clean Air Initiative for Asian Cities has shown that highly motorised cities including Delhi, Mumbai, Bangalore, Chennai, Kolkata have high levels of per capita particulates and carbon dioxide levels and these are higher than the smaller cities of Kochi, Panaji, Shimla etc. (Graph 3: *Strong correlation between air pollutants and CO_2 emissions*).

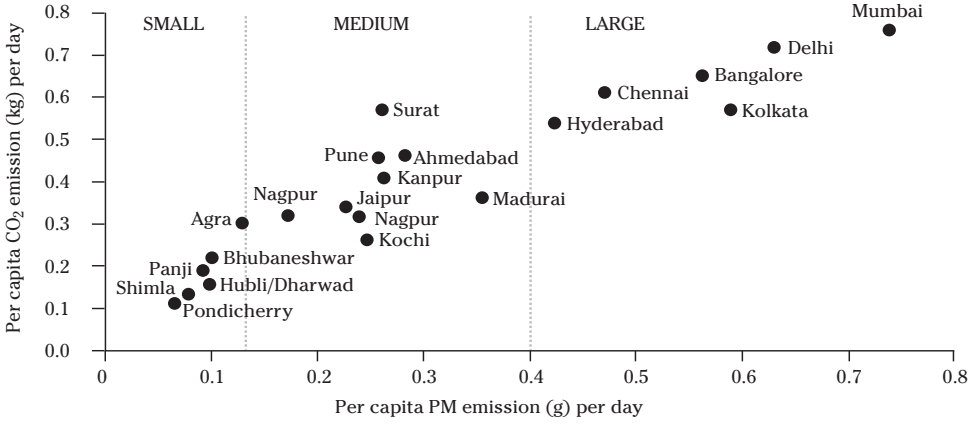
A crucial message from the emerging studies is that it is important to catch cities at

Graph 2: More than half of cities have critical pollution levels



Source: Computed from data from Central Pollution Control Board

Graph 3: Strong correlation between air pollutants and CO_2 emissions



- Indian cities show strong correlation between emissions of air pollutants and CO_2 emissions
- As cities grow in size, transport emissions increase
- Importance of catching cities early before they start to grow

Source: CAI Asia, 2008

the early stages of growth and motorization to be able to retain their traditional strength in non-motorsed transport and enable them to grow differently.

There is very little understanding about the profile of walkers in India. They are everywhere yet invisible.

2. WHO WALKS IN INDIAN CITIES?

2.1 Urban majority: There is very little policy understanding about the profile of walkers in India. They are everywhere yet invisible. There is a great variation in the use of transportation mode across all classes of road users. A clear profile of the walkers in Delhi emerges from a detailed survey by RITES in Delhi in 2001. People travel for business, service, education, recreation and to return home finally. The highest proportion of education trips – 57 per cent are walking trips. All trips for service and business form 33 per cent walk trips. (Table 2: *Percentage distribution of trips by purpose and mode 2001*).

Table 2: Percentage distribution of trips by purpose and mode 2001

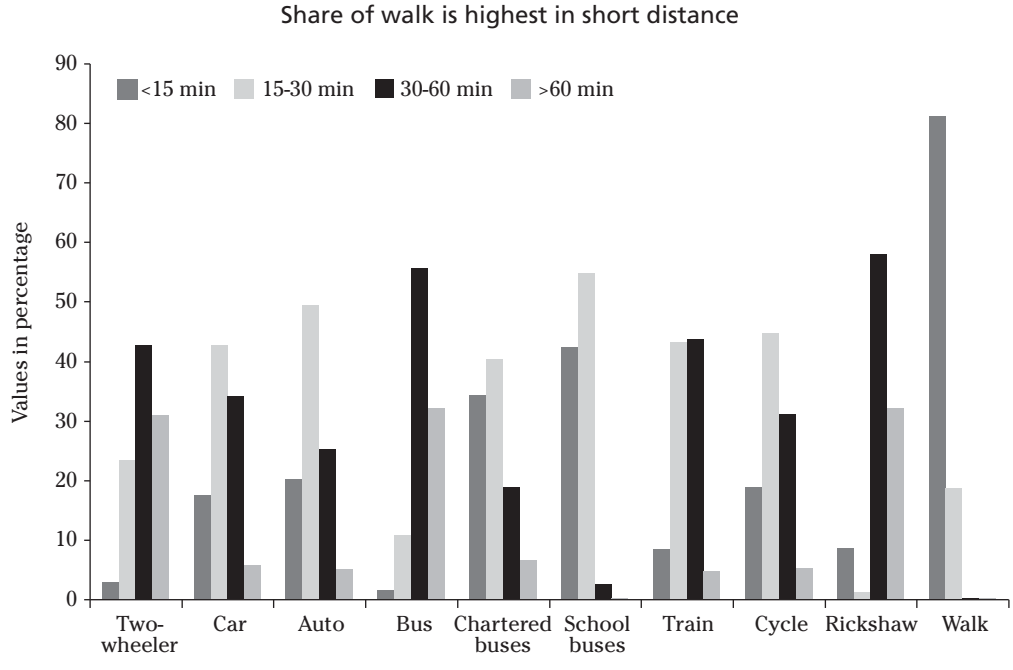
Mode of travel by purpose	Two-wheelers	Car	Bus	Auto	Chartered bus	State bus	Rickshaw	Cycle	Walk	Train
Business	27.4	19.9	25.0	2.8	0.3	0.2	1.6	2.2	21.5	0.1
Service	17.2	6.9	56.9	2.5	1.5	0.4	1.3	2.9	10.0	0.5
Education	1.7	1.3	20.5	2.5	0.3	8.0	7.5	0.6	57.6	0.0
Others	9.2	11.0	60.8	5.8	0.4	0.1	5.8	0.8	5.7	0.5
Return home	11.5	6.8	35.6	2.7	0.7	3.6	4.5	1.6	32.8	0.2

Source: RITES Ltd, Primary survey, 2001

Travel distance and travel time determine the share of walk trips in all trips for various purposes. The same RITES survey of 2001 shows that 81 per cent of the walk trips are performed with travel time of less than 15 minutes and 18 per cent between 15 to 30 per cent. The reason for the higher share of walk trips in the business and education sector is shorter travel time and distance. Travel time for 29 per cent of the business trips, and 54 percent of education trips was found to be less than 15 minutes (Graph 4 A: *Percentage distribution of trips by mode and travel time, 2001* Graph 4B: *Percentage distribution of trips by purpose and travel time, 2001*). In fact, based on the subsequent 2008 survey RITES has pointed out that they have found very large share of walking trips in the distance range of 1.3 km. This clearly brings out that if walkways are destroyed, obstructed, and distances get longer a substantial part of the short non-motorised trips can become motorized.

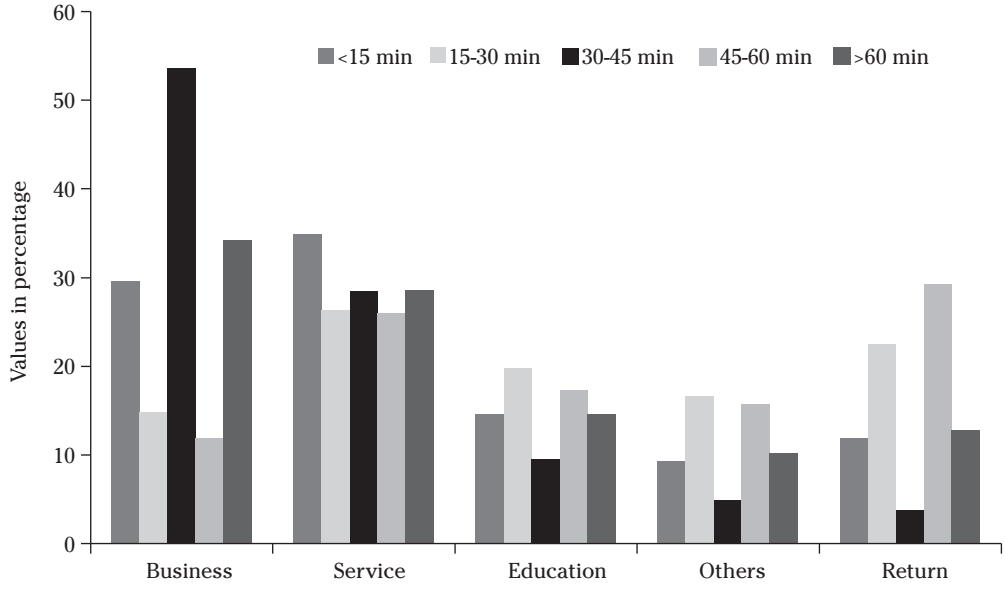
2.2 Walking and urban poor: In Indian cities many are too poor to even take a bus. Even the low cost bicycles and the cheapest mode of subsidized bus transport is often unaffordable. The only option for them is to walk. Urban poor are captive

Graph 4 A: Percentage distribution of trips by mode and travel time, 2001



Source: RITES Survey 2001

Graphs 4 B: Percentage distribution of trips by purpose and travel time, 2001



Source: RITES Survey 2001

walkers in our cities. Since walking is the mode for the poor, it is also a mode of disrepute. Unauthorized colonies, slum clusters and low income neighbourhoods, are deficient in civic amenities.

In Delhi about 60 per cent of the population lives in low income localities. There are about 1500 unauthorized colonies and 1200 jhuggi jhompri (JJ) or slum clusters. A 1999 IIT survey of the JJ clusters in Delhi showed that people with monthly income of Rs. 2000 a month commuted to work either by bus, or cycles and walks. About 22.1 percent walked, 31.43 percent used buses and 38.87 percent rode bi-cycles. All these slums, unauthorized colonies, JJ clusters are spread all over Delhi and in all major corridors.

In Mumbai nearly half of the population lives in slums. Unfortunately, often these clusters are moved to the urban periphery making cost of transportation often prohibitive for the poor as they have to depend on long distance public transport. Lloyd Wright, transportation expert from Osaka University and associated with the Institute for Transportation and Development, who has studied car free movement extensively, has pointed out that often such moves in Delhi for instance have affected women employment adversely as accessibility for them became a problem. Yet, a great part of the city transport sector budget is spent on roads to facilitate car owners that are just quarter of the city population.

Surveys have exposed stark disdain of the city planners towards integrating needs of the mobility challenged in the road design.

In Indian cities walking draws attention only for its recreational value. Walking paths are cropping up in the green areas of our cities for elite recreation. But functional networks that link up the urban poor with their employment base are ignored. Urban poor are the victims of middle class disdain (see box: *Pedestrians victim of disdain*).

2.3 Disability and walking: A New Delhi based group called Samarthyam has carried out survey of pedestrian walkways in Delhi in 2008 mainly from the perspective of people who have some form of disability. This has exposed the stark reality of complete disdain of the city planners towards integrating needs of the

PEDESTRIANS: VICTIMS OF DISDAIN

Walkers are accorded very low priority in Indian cities. Many anecdotal incidents show how pedestrians are ill treated for obstructing the way of the motorists. Indian cities are replete with stories of police ill treating the pedestrians.

Similar accounts are available from other parts of Asia. In Manila the government had devised a "wet rag campaign" to discourage pedestrians from straying off the footpath and onto the roadway. Any pedestrian found so was struck by a wet rag hanging from a municipal van. This had to be abandoned after having been found to violate the human rights laws.

In many Malaysian cities the penalty for a pedestrian crossing unmarked crossing attracts penalties that exceed penalties for motor vehicle violation. Thus, pedestrians are made to pay more than the motorists.

In Dhaka police humiliates the errant pedestrians by forcing them to do knee bend while holding their ears.

These measures are justified in the name of public safety but only denigrate the position of the pedestrians in society.

mobility challenged in the road design. This seriously compromises the mobility of the disable. According to their survey 58 per cent of the disabled found steps, ramps, difficult to negotiate. 45 per cent of elderly with walking difficulties found steps and ramps tough to deal with. More than 20 per cent found uneven, narrow sidewalks daunting. Pedestrian with vision impairment have higher frequencies of walking accidents. The only way forward is to promote universal design for accessibility to schools, workplace, health care services and leisure activities that will have to be considered to meet the diverse access needs of person with different kind of disability including autism, cerebral palsy, multiple disability etc.

The plight of the disable remains unresolved despite the Disability (Equal Opportunities, Protection of Rights and Full Participation) Act of 1995 of the Public Works Department that provides non-discrimination in transport and access to the built environment. The section 45 of the Act provides for installation of auditory signals at red light in public roads for visually impaired; curb cuts and slopes for easy access of wheel chair users; engraving on the surface of zebra crossing for blind; and appropriate signals for disable. But this has not been implemented and walkways remain inaccessible and unsafe.

Pedestrians account for 60 per cent of all the fatalities in urban areas. More than a million are injured, and a little less than a million are disabled permanently in India.

3. VICTIMS OF NEGLECT

Walking can become sustainable only if people feel safe and secured on the walkways and cross walks. But the number of people killed in road accidents in India has increased at about 8 per cent each year for the past decade. Pedestrians account for more than 80,000 of all the fatalities in urban areas, 1.2 million are seriously injured, and about 3,00,000 are disabled permanently, revealed a report from TRIPPS.

Since 1980, the fatality rate per million people has increased by 2.6 times (95 fatalities per million people in 2006). Between 1991 and 2006, the numbers of fatalities have increased by more than 70 per cent in all cities and towns. This has emerged from a recently released report prepared by the Transportation Research Institute of the University of Michigan and Indian Institute of Technology, Delhi called *Road Safety in India: Challenges and Opportunities.* The number of reported

deaths and injury might be underestimated. The figures could be much more. While number of traffic crash deaths recorded by the police may be reasonably reliable but data pertaining to injury might be grossly underestimated.

Pedestrians, bicyclists, and motorized two-wheeler riders accounted for 60-90 per cent of all traffic fatalities. This pattern is very different from that obtained in all high-income countries. The presence of pedestrians and bicyclists in significant numbers on highways accounts for the high fatality rates for these groups, even on intercity roads. Impacts with pedestrians and bicycles have a high rate on all roads, including four-lane divided highways.

A comparison of the fatality rates per million persons between 2001 and 2006 showed that only eight of the 35 cities did not experience an increase in fatality rates. The highest increase was 550 per cent in Asansol, with an overall average for all cities of 5.5 per cent compound per year. This is quite an alarming situation, as at this rate the city death rate per million persons will be doubled in 12 years. Since a vast majority of the victims in these cities are vulnerable road users, one possible cause could be increases in vehicle speeds. The probability of pedestrian death is estimated at less than 10 per cent at impact speeds of 30 km/h and greater than 80 per cent at 50 km/h, and the relationship between increase in fatalities and increase in impact velocities is governed by a power of four.

In all three cities, a majority of the fatalities were pedestrians, bicyclists, other non-motor road users, and riders of motorized two-wheelers: 86 per cent in Delhi, 93 per cent in Mumbai, and 67 per cent in Kota.

New road infrastructure is increasing the walking distance and road widths. As a result, pedestrians and commuters are exposed to higher accident risks. This further discourages use of public transport by children, disabled people and other vulnerable road users. Pedestrians have to contend with narrow pavements, often made narrower to increase the width of the road to reduce congestion for cars and other motor traffic. Pedestrians are expected to walk among parked cars, street furniture such as electricity poles, telephone poles, traffic signs, litter bins, redundant phone boxes and commercial waste.

New road infrastructure is increasing the walking distances and road widths. As a result pedestrians and commuters are exposed to higher accident risks.

The number of accidents in Delhi is almost 2.5 times higher than that of Kolkata, 2.1 times higher than Chennai and 2.3 times lower than Mumbai. Delhi has earned the dubious distinction of having the highest number of fatal cases as per 2005 data in MOUD report. The share for pedestrians involved in accidents is highest in Kolkata about 64. Bigger cities with higher share of motor vehicles show higher accidents (See table 3: *Share of pedestrians in road accidents*).

Explosion in vehicle numbers and speed are making city roads extremely unsafe. Data shows that higher share of traffic fatalities are caused not by buses but other vehicles that include the explosive number of personal vehicles cars and two-wheelers. (Graph 5: *Traffic fatalities caused by buses and other vehicles in Delhi (1998-2005).* Safety is of paramount concern to pedestrians. An earlier study carried out by IIT, Delhi observed pedestrians at selected junctions on a major arterial road in Delhi. It found that nearly 70 percent of pedestrians crossed the road when it was safe for them to cross, i.e. either it was green for pedestrians or green for right turning vehicles which makes half the crossing safe. The number of pedestrians waiting at the median was more than those waiting on the side of the road, even though there is no pedestrian island in the median. The road median does not provide any convenient space for waiting and indeed accident risk for pedestrians are high.

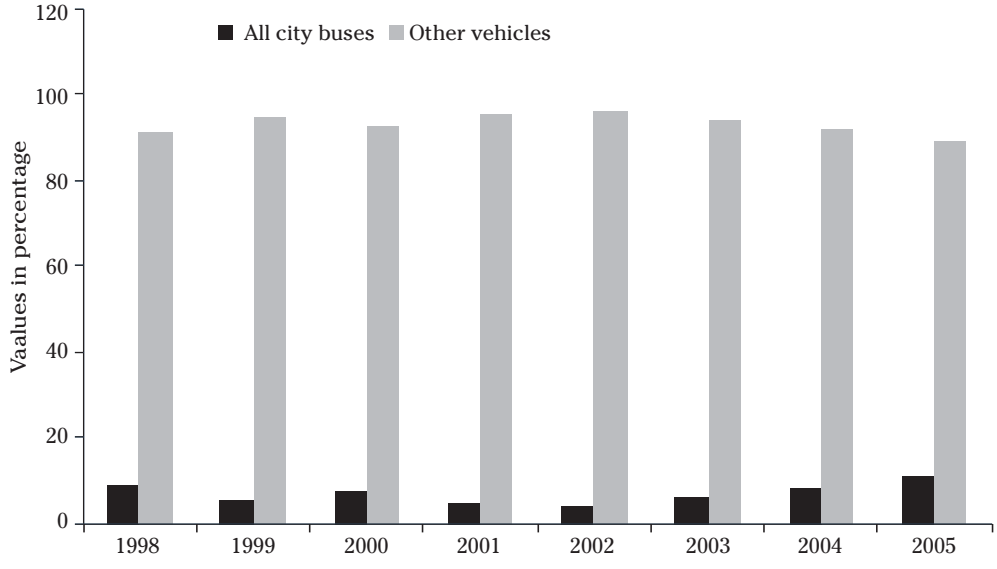
Table 3: Share of pedestrians in road accidents

Bigger cities have higher share of fatalities related to pedestrians (2005 in percent)

Cities	Percentage of pedestrians in road accidents
Agra	6
Bhopal	4
Kochi	14
Nagpur	25
Jaipur	7
Kanpur	7
Surat	43
Pune	13
Bangalore	44
Chennai	5
Hyderabad	19
Kolkata	64
Delhi	24
Mumbai	35

Source: Anon, 2008, Study on traffic and transportation policies and strategies in urban areas in India, Wilbur Smith Associates, for Union Ministry of Urban Development, May, New Delhi

Graph 5: Traffic fatalities caused by buses and other vehicles in Delhi (1998-2005)



Source: Estimated from report on "Methodology for operations of privately owned stage carriage buses in Delhi," Delhi Integrated Multi Modal Transit Systems, New Delhi

4. ANGER IN CITIES

As the pedestrian environment deteriorates in Indian cities people are forced to accept extremely hostile and unsafe walking conditions. There is simmering anger in cities. The fundamental principle that determines pedestrian route is the direct shortest distance and easy cross walks. Pedestrians always prefer at grade facilities to walk and cross roads.

Urban design needs to respect this principle. But increasingly, walking distances are increasing in violation of this principle as motorized roads are becoming very wide,

As the pedestrian environment deteriorates in Indian cities people are forced to accept extremely hostile and unsafe walking conditions. There is simmering anger in cities.

at grade cross walks are being sealed to allow seamless traffic flow, and flyovers are increasing walking distances. This is increasing modal conflict in cities. At the same time the walking space is shrinking and is obstructed. Pedestrians defy barricades and continue to take the shortest route available to them in defiance of the barriers created to keep them out of the motorways.

In Hyderabad people have begun to assert their right to walk. City based activist Kanthimathi Kannan has moved court and organized people's campaign to put pressure on the city authorities to build good walking environment. Chennai has also witnessed strident public campaigns on right to walk. The beginning of pro-walking public campaign in these cities has helped to bring some of these concerns to the forefront and sensitise people about the plight of walking (Box: *Anger of those who walk in Hyderabad*). This movement needs to gather momentum across all cities of India.

People have begun to react in Mumbai as well. The transport planning process has systematically eroded walkability from the city's collective conscience. As conditions of the footpaths have deteriorated policy obsession with skywalks have increased. Elevated walkways are being constructed to disperse commuters from congested bus stations. The development authority has planned 50 skywalks in the Mumbai Metropolitan Region. The existing skywalks are dismally underused. These were constructed for a period of peak hour capacity of 5,500 commuters but less than 100 people use it. This is a complete mismatch between pedestrian needs and what the city planners have to offer (Box: *Perilous walkways and public angst in Mumbai*)

The plight and the anger of disabled is strongly articulated by the New Delhi based Samarthyam (a Civil Society Organization promoting Accessible Environments for Disabled Persons). It has launched a Project with The University of Delhi on "Accessible University of Delhi", to make all colleges disabled friendly. It is mandatory under The Persons With Disabilities (PWD) Equal Opportunities, Protection of Rights and Full Participation Act, 1995. University Grants Commission (UGC) has issued necessary orders/directions to all the Universities and Colleges to implement provisions of the PWD Act conscientiously. Samarthyam has also done extensive studies along with the Delhi IIT to highlight the design changes needed to make footpaths more disable friendly.

It is fighting to get approach roads, Bus-Q-Shelters and sidewalks to comply with accessibility guidelines, so that persons with disabilities and reduced mobility could access external environment with safety and independence. They have conducted access audit of the Benito Juarez Road and the area around the Sri Venkateswara College, South Campus, Ram Lal Anand College and Moti Lal Nehru College to assess the existing facilities and provide suggestions for further improvement. They have reviewed sidewalks, street Furniture, curbs & curb ramps, road signages road crossings, median refuge, intersection, bus-Q-Shelter, parking, and bollards.

As conditions of the footpaths have deteriorated policy obsession with skywalks have increased in cities like Mumbai.

In some areas of Delhi road engineering interventions including flyovers and road widening that give priority to motorized traffic have made road crossing and easy access so difficult that the local residents now feel compelled to demand foot overbridges even though these are not pedestrians friendly. For instance, resident welfare associations (RWA) in many localities of Delhi have begun to demand foot overbridges for safe passage. In one of the most recent instances RWA of the Saket colony in South Delhi has finally got a nod from the Public Works Department to build a foot overbridge connecting the colony with Hauz Rani city forests to avoid

ANGER OF THOSE WHO WALK IN HYDERABAD

People assert their right to walk

Kanthimathi Kannan, an activist in Hyderabad has started the Right to Walk campaign. In a letter to the chief justice of the Andhra Pradesh High Court, she has petitioned for the "right to walk on pavements" and has asked the chief justice to treat her letter as public interest litigation (PIL) to save the footpaths in her neighbourhood. "In Mehidipatnam there are no pavements left for walking. There is no place for senior citizens to walk on the road. Nothing moved ahead even after meeting and writing to higher officials in the Municipal Corporation of Hyderabad (MCH) and senior government officials. I had no option, but to go to court. Where do the citizens of this country walk?" asks Kanthimathi.

The situation in Kanthimathi's home city is particularly disquieting. In 2004, road accidents claimed 419, mostly pedestrians. According to a World Bank study of 2002, around 20 per cent of commuters in Hyderabad, walk. But according to a more recent study by Chennai-based engineering firm L&T Ramboll, the figure is much higher. This study drew upon household surveys to conclude that pedestrians constitute more than 39 per cent of traffic in Hyderabad.

Right to walk, (or R2Walk) campaign that Kanthimati has launched has taken her city on a walk path. The group has organized signature campaigns and appeals to the state government to rebuild the footpaths. Some of the key stretches in the city that are included in their appeal include Rythu bazaar footpath in Mehdipatnam, footpaths in Lakadikapul, and Masab Tank among others. In many of these places footpaths are severely encroached or are used for parking. Sustained campaign has been launched to garner support from the celebrities and the media.

To raise awareness the group has organized walkathons with volunteers and schools and also walkability studies. Team of students from Vidyaranya High School, undertook right to walk project. Students undertook walkathon to assess the state of pedestrian walkways. They assessed the state of obstruction, and obstacles, the status of footpath and quantum of traffic. They found unused bus shelters, electricity transformers, they found people spitting and urinating and parked vehicles.

This campaign has led to the formation of pedestrian safety cell. It is now trying to bring about greater coordination amongst the departments and even trying to get a single authority to take charge of the pedestrian issues. Pedestrian governance is made even more complicated by the multiplicity of agencies involved. Presently, there are four to five departments in Hyderabad that deal with footpaths and pedestrian crossings. This is clearly a common experience in most of our cities but remain unnoticed and neglected.

PERILOUS WALKWAYS AND PUBLIC ANGST IN MUMBAI

South Mumbai's Fort area, developed way back in 1880s by British, is now a main business district of the city. It has a reasonably good network of footpaths and a recent study shows that over 70 per cent of the people from the nearby four local train stations — Church Gate, Marine Lines, CST and Masjid Bunder —- come walking to Fort. But in other areas of Mumbai, especially the suburbs footpaths are non-existent and pedestrians are a cursed lot.

Whereas Mumbai Metropolitan Regional Development Authority (MMRDA) is going full force in implementing various infrastructure projects in Mumbai, such as Metro rail, monorail, sea links, expressways, flyovers, etc, providing basic pedestrian infrastructure such as footpaths is not on its agenda. The new business districts of the city have no provision for walking. "Business districts like Powai, Bandra-Kurla Complex, Andheri East, Mindspace in Malad, etc. have been developed only for people who come in their fast moving cars. There is no provision for pedestrians. Even though footpaths have been provided in some places, these do not connect or integrate with the other parts of the city. Hence they do not enhance walkability," says Pankaj Joshi, an architect and executive director of Mumbai-based Urban Design Research Institute, an independent organisation working on urban planning issues.

Urban planners and architects claim that the state government is working against its own data, which shows that almost 54 per cent average daily trips per day are made by walking. "In its right sense, any planning agency should cash upon this fact and strengthen the pedestrian infrastructure. But MMRDA in the name of pedestrianisation, has now started constructing skywalks that resemble

...PERILOUS WALKWAYS AND PUBLIC ANGST IN MUMBAI

ugly caterpillars and do not solve the problem," says Ashok Datar, a transport expert working with the Mumbai-based NGO, Mumbai Environmental Social Network.

Urban planners claim that Mumbai can easily be turned into a pedestrian-friendly city provided the planning authorities desire so. Pedestrianisation will also be cost-effective when compared to other transport projects such as Rs 800 crore Bandra-Worli sea link or Rs 125 crore per kilometer Metro rail (Rs 600 crore per km for underground sections of the Metro rail project. The total cost of Metro rail project is pegged at about Rs 20,000 crore).

UDRI has recently launched a year-long project to study pedestrianisation in Mumbai and how the city can be made more walkable. The initial findings of this study expose how the system itself discourages pedestrians. The classic example is two traffic signals in front of CST station, one of the busiest train stations in Mumbai. Both these traffic signals are programmed in such a way that pedestrians can never cross the road. The divider between the road is so narrow that barely one person can stand on it. There are many more traffic signals like these which discourage pedestrian movement in the city, found UDRI.

Residents of Mumbai have paranoia with footpaths, which they feel, attract hawkers or homeless. In some areas, residents themselves put big plants in all sides of the pavement, only to avoid some homeless people sleep on the footpaths. The footpath from Link Road in Andheri to Juhu has been encroached by pavement dwellers. Even the divider between the road has not been spared and is used by homeless people to sleep in the right.

In some areas such as Lokhandwala in Andheri West, footpaths are barely a metre wide. The bus-stops that BEST has constructed have also caused much destruction of pavements as these encroach upon them, leaving little or no space for pedestrians.

Take the case of recently inaugurated flyover at Western Expressway near Thakur Village in Kandivali East. No provision has been made for pedestrians and now as an after thought, skywalks are being proposed.

Some soft measures can be taken to make some high pedestrian areas more walkable. For instance, traffic movement can be stopped during peak hours, allowing free movement of people on foot. In some Western countries, tall physical structures are erected to make certain areas inaccessible to cars. Bora Bazar area in south Mumbai can be made pedestrian-only zone during the day time, whereas traffic can be allowed during early morning and night time when delivery vans come. A simple step like painting zebra crossings can also go a long way in easing pedestrian problems in Mumbai.

There are research organisations and architects who are working towards making the neglected pedestrians and hawkers, become part of the larger fabric of the city. One such organisation is Juhu-based architecture college, Kamla Raheja Vidyanidhi Institute for Architecture (KRVIA). Along with P K Das & Associates, an architecture firm, and the residents of Juhu, it has conducted an in-depth study in 2008, titled 'Re-imagining the public realm: the case of Juhu-draft plan'. Commonly known as Vision Juhu, the aim of this study is to integrate various public spaces in Juhu and make the area more pedestrian friendly. "Our study area had a mix population ranging from film personalities like Amitabh Bacchan, Shabana Azmi to two *gaothans*, fishing villages and slums. We needed a common thread that binds this entire area together and realized that Irla nala that flows through this area provides a good platform. Also after the July 26, 2005 flood, people have awakened to the importance of these nalas that were actually natural waterways," narrates Benita Menezes, lecturer at the design cell of the institute.

So as part of the study, KRVIA has proposed 6 metres area on both sides of this nala to be protected and developed in such a way that water permeability is enhanced and the developed area is used to relocate the hawkers. This developed area will have pedestrian walkways and would be connected with other open areas of Juhu, thus allowing free pedestrian movement.

Take the case of proposed Metro line from Colaba-Bandra-Charkop. Three Metro stations fall within Juhu area and at present all these three stations directly open on the main roads. "Can you imagine the chaos on roads when commuters from these Metro stations directly come out on the roads? We have proposed realignment of these stations and reclamation of a strip of land from airports authority. If that is done, then burst points for Metro stations would be at green open spaces. And from there people can easily deflect in various directions using footpaths or the developed sidewalks of Irla nala," says Menezes.

Like Irla nala, there are many more nalas/small rivers in Mumbai, such as Oshiwara river, Dahisar river, Poisar river etc, that can be developed along the same lines. But

Menezes claims that one big plan for the city will not work. We need multi-scalar approach in which neighbourhoods prepare their own micro-plans, as they are aware of local resources and problems, and see how best their area can become walkable, she says.

However, stage is getting set for Mumbaikars to demand rights of pedestrians. Last year, a group of Mumbaikars headed by Krishnaraj Rao formed Sahasi Padyatri (brave pedestrian), an informal group of residents demanding obstruction free and safe footpaths in the city. In March last year, activists of this group launched a stayagraha and went around the suburbs of Mumbai and painted lanes on the road and declared them pedestrian-only lanes. "We organized many such events in Bandra, Borivali, Chembur, Matunga, Mumbai Central and Vile Parle. In Vile Parle alone we organized 20 such events at the some point. We expected motorized people to get angry and fight with us, but surprisingly their response was extremely positive. People in the cars told us that we were doing the right thing. I think people saw the point we were trying to make," says Rao.

ANGER AGAINST SKYWALKS IN MUMBAI

Skywalk is an elevated walk way dedicated to the pedestrians. It connects the railway station/high concentration commercial area with the destination points where concentration of pedestrians prevails. The purpose of skywalks is efficient dispersal of commuters from station/congested area to strategic locations viz. bus stops, taxi stands, shopping areas, off roads etc. and vice versa. MMRDA has planned 50 skywalks in the entire Mumbai Metropolitan Region at a total estimated cost of Rs 600 crore. In Mumbai, these skywalks dot city's entire skyline. For instance, skywalks are proposed in Parel, Kurla, Goregaon, Vile Parle, Andheri (E), Andheri (W), Kandivali, Grant Road, cst to Church Gate, Dadar, Chembur, Ghatkopar, Mulund, Malad, Santa Cruz, Dahisar, etc. Name any area, and there is a skywalk planned.

One such pilot skywalk is already operational since June last year between Bandra (E) station and Kalanagar (Bandra-Kurla Complex). It is 1,300 metres long and 4 metres wide. It has been planned so that people from Bandra station can walk to their workplaces in Bandra-Kurla Complex. However, reality is different. "This skywalk has been constructed for a peak hour capacity of 5,500 commuters. But the usage is less than 100 people in peak hour. MMRDA has spent about Rs 13 crore for constructing this elevated walkway, but clearly there is a mismatch between pedestrian needs and what the state is offering," says Ashok Datar, a transport expert working with the Mumbai-based NGO, Mumbai Environmental Social Network.

Sudhir Badami, Mumbai-based transport consultant feels that mindless sprouting of skywalks shows government's escapism from wanting to get footpaths in order. "Skywalks may be necessary in some area, but they should not be made a norm," he says.

Architects and planners are criticizing the way skywalks are being constructed. "India is a democracy and everyone has a right to have space on the road. Why should roads be left only for private cars and pedestrians be pushed on to the skywalks? Pedestrians must be provided space on the road itself. This is non-negotiable," says Faizan Jawed, an architect-cum-activist who has recently passed out of Rizvi College of Architecture, Mumbai. Jawed is also running a campaign demanding dedicated cycle tracks in the city.

A campaign has already been launched by NGOs against the proposed skywalk from CST to Church Gate in south Mumbai. MMRDA has recently decided to extend this skywalk to Mantralaya and Colaba, and this had raised many eyebrows. "These areas have good footpaths that are encroachment free. Many pedestrians use them. People also walk through Oval Maidan and Cross Maidan to reach their respective stations. Why should pedestrians be made to climb up skywalks?" questions Neera Punj, convener of CitiSpace, a civil society group working towards protection of open spaces in Mumbai. Colaba and Fort area of Mumbai have over 150 heritage structures that would get ruined by these skywalks, she claims. CitiSpace has already shot off a letter to state chief minister demanding scrapping of cst-Church Gate- Mantralaya-Colaba skywalk. Punj alleges that state government is ready to push only those transportation projects that cost crores and involve a private limited company.

the heavy traffic on Mehrauli-Badarpur road. This has been possible only after a battle of nearly three years with the Public Works Department. Car centric roads are forcing people to opt for foot overbridges.

5. HOW WALKABLE ARE OUR CITIES?

A city may have high pedestrian volume but it may not be walker friendly. And if hostile conditions persist pedestrian traffic will decline. The percentage of the road with pedestrian footpaths runs hardly in 30 per cent in most cities. In Delhi however a higher share of road network — about 60 per cent has footpaths but the quality of footpath is very poor.

Comprehensive assessment of pedestrian walkways across cities is still not available in India. The Wilbur Smith study has rated 30 cities of all sizes for their walkability based on an index. This assessment is based on availability of foot paths on major arterial roads, and overall facility rating by pedestrians themselves. The pedestrians have assessed on the basis of availability footpath and its quality, obstruction, maintenance, lighting, security from crime, safety in crossings etc.

In this index a low rank indicates inadequate and substandard pedestrian facilities. The national average index for Indian cities is 0.52 which is very low compared to the international standards (See Table 4: *Walkability of 30 cities in India*). London scores 1.5 to 1.7 as it has focused policies on pedestrian traffic. Small and medium towns in India have scored less. This is ironical because the small and medium towns have high pedestrian flow. All larger cities have scored better than smaller cities, naturally, as more investments have been made in the overall road infrastructures in these cities. The hill towns have scored lower values, indicating poor condition and availability of pedestrian facilities. Clearly, smaller cities with higher pedestrian volumes have poorer pedestrian facilities.

5.1. CSE team takes a walk

Centre for Science and Environment has conducted a random survey in selected locations in Delhi to asses the status of pedestrian walkways to identify the key barriers that undermine the quality of the pedestrian ways. This survey has been carried out to highlight the key policy changes needed to improve walkability in Delhi in terms of infrastructure and design and pedestrian rights. The assessment involves auditing of the walking infrastructure against existing guidelines. The footpaths have been benchmarked on the basis of engineering design, overall environment of the sidewalks and traffic conditions. This is a qualitative measure that defines the operational condition of the pedestrian environment. This has been supplemented by the pedestrian perception survey on these stretches of roads to assess what do the pedestrians feel about the walking condition.

CSE conducted a random survey in selected locations in Delhi to assess the status of pedestrian walkways and identify the key barriers.

This study and its methodology were designed in a way that made participation of students and other community members in the survey process easy. The purpose was to involve the community, and to sensitise them.

It has become necessary to understand the state of walkability in the neighbourhoods of Delhi as the city has embarked on massive scaling up of public transport infrastructure. If Delhi has to again improve the modal share of its public transport that has slipped so deplorably over the last few years from 60 per cent to 43 per cent, rebuilding its walking infrastructure will become absolutely necessary. This will also help to convert short motorized trips to walking trips to access

Table 4: Walkability of 30 cities in India

Higher index score indicates better walkability

Cities	Walkability index score
Shimla	0.22
Bhubaneshwar	0.28
Gangtok	0.30
Panaji	0.32
Pondicherry	0.37
Hubli Dharwad	0.39
Gwuahati	0.39
Amritsar	0.31
Thiruvanathapuram	0.34
Agra	0.38
Varanasi	0.33
Bikaner	0.43
Raipur	0.41
Madurai	0.40
Bhopal	0.47
Kochi	0.57
Kanpur	0.59
Patna	0.65
Bangalore	0.63
Nagpur	0.66
Jaipur	0.64
Hyderabad	0.68
Surat	0.62
Chennai	0.77
Kolkata	0.81
Pune	0.81
Mumbai	0.85
Ahmedabad	0.85
Delhi	0.87
Chandigarh	0.91
National	0.52

Source: Anon, 2008, Study on traffic and transportation policies and strategies in urban areas in India, Wilbur Smith Associates, for Union Ministry of Urban Development, May, New Delhi

essential services in the neighbourhoods and address the equity concerns of the urban poor.

The locales that were surveyed represent residential and commercial land-use classes and also the different income neighbourhoods. The sites selected are representative of different land-use. The pilot bus rapid transit corridor from Ambedkar Nagar to Chirag Delhi that has a specially designed dedicated pedestrian lane has been of special interest. Connuaght Place is the central business district of Delhi and Lajpat Nagar is an important shopping and commercial area in South Delhi. Nehru Place on Bhakti Vedant Marg is another business district. Interstate Bus Terminus (ISBT) is an important interchange point as it has both a bus terminus and a metro station. All India Institute of Medical Sciences (AIIMS) is a sensitive area. Close to it is located a recreational area, Delhi Haat. Patparganj in north east

The survey was done in a way that made participation of students and other community members easy. The purpose was to involve the community and to build awareness.

Delhi, Chittaranjan Park and Alaknanda in South Delhi are prominent residential colonies. Seelampur Zaffrabad in north-east Delhi, Govindpuri on Guru Ravidas road are low income neighbourhoods.

The team has reviewed various methods that are available globally for street audits and ranking and derived an appropriate method for a rapid assessment that can be carried out in a participatory manner with students and volunteers. CSE considers participation of the larger community in the primary survey important to create awareness about walkability. The method had to be kept simple and yet comprehensive. This method has assessed the engineering features, the overall environment and traffic conditions adjacent to the walkways. This was backed up by the pedestrian perception of the walkways and the review of the existing policies and regulations of different public agencies responsible for implementation of pedestrian infrastructure and services. A review of global best practices has helped to understand the way forward.

The technique for assessing the walking environment includes reviewing, auditing and rating. Most of the methods for assessment of walkways are based on qualitative criteria that allow a lot of room for discretion of the assessor and users. Based on this the scores are assigned to quantify the problem and indicate the variability on the scale. The review is mostly subjective and qualitative. Auditing is a more quantitative technique though its based on qualitative assessment. Street auditing is carried out against the existing design guidelines used by the city authorities. It identifies deficiencies, maintenance issues and proposes solutions.

Some of the well known methods to assess walkability include the walkability index of cities of the World Bank, Pedestrian Environment Rating System (PERS) of Department of Transport London which is very comprehensive, and Community street review method of Land Transport, New Zealand, and there are a few individual expert models like the Dicksonian method of assessing pedestrian level of service, etc. Most of these methods have created a benchmarking system that includes a wide range of criteria against which the assessments are carried out. There are overlaps in these methods as these have been largely designed keeping in view the objectives of the surveys. Broadly, all the criteria capture convenience, security and safety, quality of services. Interestingly, most of these methods do not assign weights to criteria on the assumption that all variables are equally important and do not over-emphasise any one aspect.

Walkability survey captured criteria related to engineering features, overall environment of walkways and traffic conditions.

Thus, the design features such as the continuity of sidewalks, their width and the material used for paving them, height of the footpaths/sidewalks, the street lighting facilities were considered as these have an impact on the pedestrians and their ability to use the infrastructure. This is further complemented by the review of crosswalk design facilities like the availability of pedestrian signages, the availability of a kerbed ramp or blended crossing to access the crosswalk facilities, exposure of the pedestrians to traffic that acts as barrier effect for them, available time to cross the roads where the facilities are at grade especially for the vulnerable population, existence of pedestrian refuge islands for the pedestrians to wait when they are crossing the roads without being hit by the speeding vehicles, whether facilities have universal design that is usable by disabled person.

Equally important was the survey of the overall environmental conditions for the pedestrians. Walking can become extremely difficult if walking environment is poor and hostile. Walkers need clean and unobstructed passage, and amenities including gender sensitive public toilets, telephone facilities, drinking water facilities, food kiosks, dustbins, arcades, and trees. These facilities need proper siting so as not to

obstruct the pedestrian through routes. Equally important is maintenance and cleanliness of the pedestrian facilities and protection from sporadic crimes. But the random survey has shown how severely obstructed the walkways are. Garbage heaps, dumping of construction materials, potholes, open sewers, slum proliferations, open urinals and defecations, transformers and police kiosks, extended encroachment of shop owners and hawkers have decimated the pedestrian environment. Survey reviews modal conflict with traffic because of inadequate sidewalks. Motorists do not yield to walkers.

None of the sites surveyed has made it to the top rank that truly approach the superlative quality. However, dedicated pedestrian path on the pilot BRT corridor is the best amongst all.

5.2. What did we find?

All the locations surveyed have been ranked on scale of six and classified on the basis of the following six performance classes: Best, Very good, good, medium, poor and very poor. These have been assessed from the perspective of engineering features, and their overall environment. All sites have been assessed individually for engineering features, traffic variables and their overall environment. (See graphs 6 to 8: *On ranking of locations*).

None of the locations has made to the top ranks: Of all the sites assessed none have qualified for the top two ranks that truly approach the superlative qualities as evident from the international best practices. The top ranks reflect the combined best of the engineering features, level of services and the overall environmental quality that truly are world class.

Pedestrian way on the BRT corridor is best amongst all surveyed: The dedicated pedestrian path in the pilot corridor of bus rapid transit system between Ambedkarnagar and Chirag Delhi has scored the highest amongst all. This has a dedicated and specially designed space for pedestrians.

This has scored high on engineering features. The roadway designing has retained the continuity of the sidewalks. This has wide and well surfaced sidewalks and are disable friendly. The sidewalks are relatively clean and well maintained. These are easily negotiable by women and children and also the senior citizens, as the height is close to 15 centimeters. The width of the sidewalk varies from a minimum of 1.5 meters to 4.5 meters along the corridor. Sidewalks are well lit.

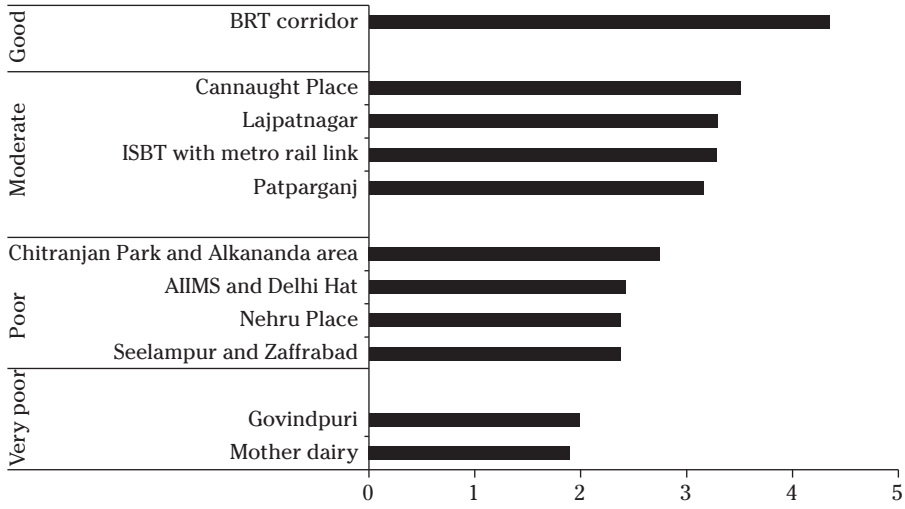
The crosswalk facilities are at grade, with zebra crossings and pelican signals. The intersections are well designed and paved with speed tables that act as traffic calming measure. The crossings are easily accessible with kerbed ramps and there is a holding area for people to wait at the side and at the pedestrian refuge islands. The crosswalk facilities being at-grade can be treated as best for the older population, the disabled and the visually impaired for whom there is an audio facility for crossing the road.

The specially designed pedestrian path on the BRT Corridor has the least permanent and temporary obstructions on the sidewalks. Its salubrious environment invites the pedestrians to walk.

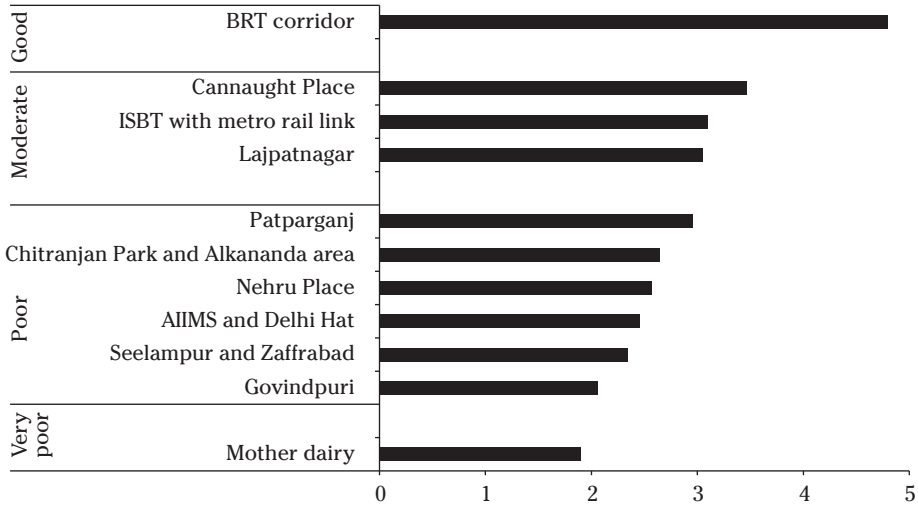
However, the corridor is still deficient in providing formal pedestrian amenities including drinking water, food kiosks and public conveniences for women. The sidewalks also lack shade between Pushpvihar and Press Enclave. There are very few places to rest except for the concrete bollards at Ambedkarnagar and at Press Enclave. Also the heavy volume of pedestrians on the newly improved sidewalks makes it a safe environment. However, there are very few dustbins on the sidewalks and more such facilities are required to upgrade cleanliness.

Graph 6: Who is best amongst all?

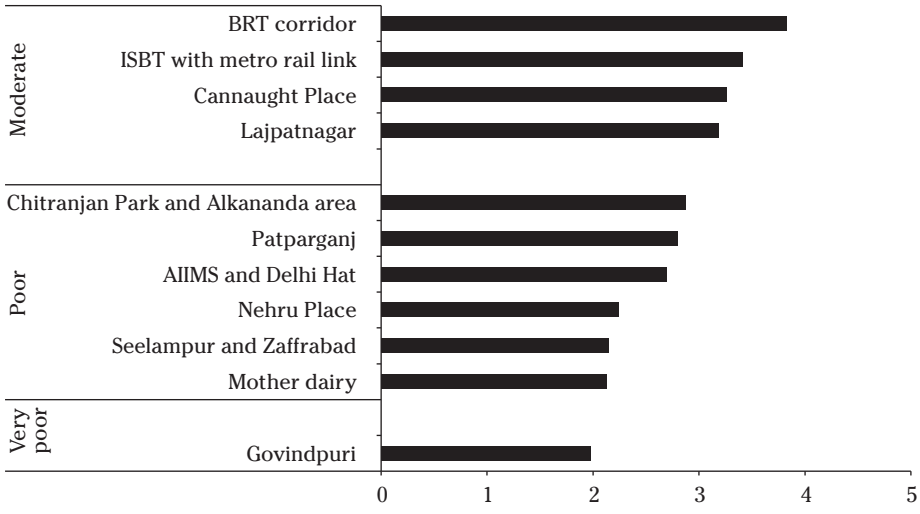
Overall ranking based on engineering features, environmental and traffic conditions



Graph 7: Who has the best sidewalk?



Graph 8: Who has the best crosswalk Facility?



THERE ARE INTERESTING MESSAGES IN THIS RANKING

- **BRT scores best on all counts.**
- **Poor neighbourhoods score worst.**
- **AIIMs and Delhi Haat may look deceptively nice but it is not pedestrian friendly. This site has scored low because of too much dependence on subways that has increased walking distances and are not easily negotiable by the ailing visitors; severance of landscape, narrow and highly encroached footpaths.**
- **Even though the footpaths in residential colonies of Chittaranjan Park and Patparganj are poorly maintained these have scored higher than AIIMs because they have at-grade crossings and easily accessibile sidewalks.**
- **Nehru Place has scored so low because of discontinuous sidewalks and inaccessible curb height. A lot of jay walking and difficult crossing**
- **Though ISBT area is also dependent on subways it has scored better mainly because of the walkway link between the metro station and the bus station.**
- **Lajpatnagar also has many problems. But its ranking has improved because of pedestrianisation of 1.5 km stretch near the shops.**
- **Cross walks are the biggest problem everywhere. This also makes people vulnerable to accidents. Some sites that have scored higher on sidewalks have slided on cross walks. Like Connaught Place has done well on sidewalks but scored lower on cross walks.**

BRT corridor: Continuous sidewalks. Even vehicular passage does not interrupt

The corridor can improve its level of service by creating formal amenities for pedestrians. It is almost free of encroachments except for in the evening hours near Press Enclave and at Ambedkaranagar. The presence of hawkers at Ambedkarnagar makes the ambience ebullient and secured for women. But there are stretches that are encroached by parked vehicles. The through route is not occupied and the wide sidewalks provide ample space for walking. Also, the trees on the sidewalks do not obstruct the through route of the pedestrians as they are placed on the street furniture zone. Besides, there is considerable shy distance from the motorized traffic.

Yet, the BRT pedestrian lane has not made it to the best rank**.** Problems have persisted with its crosswalks. Its operation by the users is difficult as the pelican signals often do not function especially at the Chirag Delhi intersection and people find it difficult to cross and also the audio facilities are not audible and are not regularly operated. The malfunctioning of the pelican signals often increases the waiting time for pedestrians and they tend to jaywalk. The malfunctioning of lights increases the exposure of pedestrians to traffic. These elements have lowered its scores. The corridor has to work on bus first and all red phase for pedestrians and the lights have to be kept in working conditions.

Walkways have a very important role to play in linking the interchange points of different transport systems.

Walkways as dispersion link from transport hubs – case of metro and bus station at ISBT: There is a special interest in Inter state bus terminus (ISBT) because it is a multimodal site where both a central bus station and a metro station co-exist. Walkways have a very important role to play in linking the interchange points of different transport systems – bus, trains, metro. This distance should be the shortest and the most direct route and walkable. From this perspective the Interstate bus terminus that contains a major bus terminus catering to a large flow of inter state passenger traffic and also a metro to reach out to the central Delhi, is important. The waves of pedestrians increase with offloading at the bus stops. That

brings out the close synergy between public transport and pedestrians.

Residential colonies that have high pedestrian volume have dismally poor footpaths.

But this site has scored medium. While the metro station and ISBT is directly connected with a path and it scores high on that count, the overall access from different directions is highly impeded. The main road at ISBT has been completely debarred from at grade crossing by the pedestrians to provide signal free corridors for the motorized vehicles. Subways and foot-overbridges have become essential. However, the sheer volume of the traffic at ISBT from the flyovers compels the pedestrians to use the underground crosswalk facility and there is almost no jaywalking at this place. The crosswalks are not disabled friendly. The flyover makes people walk longer distance to access the crosswalk facilities to reach bus stops on the other side. However, the integration of the bus station with the metro stations through a walkway that allows people easy access with minimal conflict has helped the location to gain points.

The sidewalks in both these sites are discontinuous but they are wide and connect the landuses for the pedestrians well. The widths of the sidewalks though vary between 3 –5 meters and are comfortable for pedestrians. But their sheer height deters them from using the infrastructure. The sidewalks are discontinuous and there are no ramp facilities for accessing them as the height of these footpaths at points are more than 18 centimeters and therefore difficult to negotiate. Though pedestrians at ISBT (with modal integration with metro) have been removed from the roads to create space for the motorized vehicles and to provide them with signal free corridors, the government has tried to make the pedestrians safe by offering them subways and foot-overbridges. The sheer volume of the traffic at ISBT from the flyovers compels the pedestrians to use the underground crosswalk facility.

The wide sidewalks that earlier had railing have been taken off. But no efforts have been made to upgrade the walkway. Also the public toilets are not well maintained and the area is a nuisance for the pedestrians crossing them. These public toilets cannot be used by women.

The last mile from the public transport nodes to destinations is the crucial issue that needs careful planning. It is essential to connect metro and bus stations with pedestrian networks. Delhi Metro is offering feeder bus service. But the urban local bodies need to establish pedestrian network.

Poor maintenance at ISBT deters pedestrians from walking on the footpath

All residential colonies have scored poor: Residential colonies that generate high volume of pedestrian traffic have dismally poor footpaths. The residential locations surveyed – Alaknanda, Chittaranjan Park and Patparganj – with high pedestrian traffic have scored poor.

The wide footpaths of Patparganj need to be cleaned up and made obstruction free. The situation drastically deteriorates as one approaches the urban villages near this colony. The pedestrians wriggle their way through the fast moving traffic. Zebra crossings have faded. There are stretches where there are no footpaths and that too adjacent to a school. The areas demarcated for the pedestrians are unpaved that force people to walk in conflict with the motorized traffic. Curb height of the footpaths are also problem on some stretches. The Rules of Road Regulation 1989 states that if there are no traffic signals and zebra crossings, the first right of way is that of the pedestrians but in practice it is just the opposite.

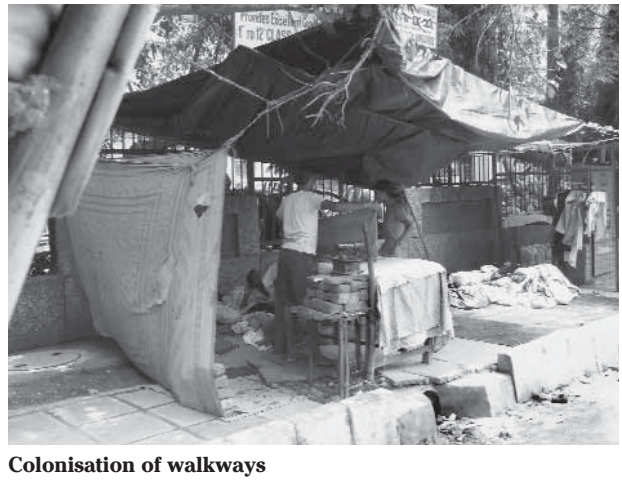
At places zebra crossings have faded and the pedestrians while crossing face the street light pole which causes obstruction. On some stretches there are no footpaths and that too adjacent to a school. The areas demarcated for the pedestrians are unpaved and people prefer walking in conflict with other modes. Curb height of the footpaths are also problem, especially near Dharma apartment bus stop.

Near Madhu Vihar market the sidewalks are obstructed by cars parked on the

Patparganj: Zebra crossing hits obstructed median

Patparganj: Garbage dump on sidewalks

Patparganj: Potholes endanger pedestrians close to Ramkrishna Apartment



Colonisation of walkways

sidewalks. People are therefore compelled to walk on the carriageway. Chittaranjan Park has narrow footpaths that are highly encroached near the markets.

Low income neighbourhoods with huge captive pedestrians rank the lowest: Ironically, all low income neighbourhoods including Govindpuri, Seelampur and Jaffrabad with enormous captive pedestrian traffic have scored very poor. This brings out the equity challenge of urban planning. This population is dependent nearly entirely on public transport or just walking to access jobs and services. It might even be too expensive for these urban poor to use public transport. Estimates show that transport cost for urban poor could be as high as 25 per cent of their income. Equity demands that urban planning takes this imperative into consideration.

The Guru Ravidas Marg cutting across Govindpuri market area has footpaths for most of its stretch; but the footpaths are discontinuous, poorly paved and not easily accessible. At places the height of the pavement exceeds 22 centimeters against the accepted height of 12-15 cm. The width is barely 1.5 meters. The poor signages, lack of pedestrian refuge islands make accessibility and crosswalk an ordeal. There are no kerbed ramps or blended crossings to access the crosswalk facilities. The exposure to traffic is very high. The absence of signalised crossings increase the waiting time period for the pedestrians more than 60 -80 seconds and there is tremendous jaywalking in this area and the pedestrians cross from wherever they feel like often risking their lives.

Zaffrabad: Poor people are captive pedestrian but they suffer the most

Pandav Nagar near Patparganj: Totally encroached

Mother Dairy: Who can negotiate this height?

Zaffrabad: Unpaved and narrow path to Metro station

In Bhakti Vedant Marg near Nehru Place the signal free stretch is very difficult to cross. Cross walk facility is very poor on this public works department road. The public agency is constructing two foot-overbridges but they are not along the desired lines of the pedestrians and the complicated structure will discourage them from using it. Moreover, these structures occupy a lot of space on the sidewalks, disrupt the sidewalks and leave little or no circulation space. The exposure to traffic is high. The absence of traffic signals increases the waiting period for the pedestrians and the pedestrians jaywalk risking their lives. These foot overbridges are also not disabled friendly.

Also on the same Bhakti Vedanta Marg that connects Nehru place bus terminus with Kalkaji temple, footpaths are discontinuous and exist only on one side at some stretches. The height of the footpath is more than 30 centimeters at places with no ramp facilities to access the crossings and no facilities for the disabled. This force pedestrians to walk on the roads in modal conflict. The presence of three flyovers in close proximity to the Kalka temple has spelled havoc for the pedestrians.

The stretch on the Guru Ravidas Marg where there are shops, narrow width are a problem. As per the IRC Guidelines the width should be 3 to 5 meters. Zaffrabad on Atmaram Marg in New Seelampur area that is close to Seelampur metro station is very neglected. Pedestrian volume is high on this stretch but the approach to the bus stop or the metro station is bereft of any semblence of footpath. The motorists rarely yield to pedestrians near Zaffrabad bus stop on Atmaram Marg and near Metro station.

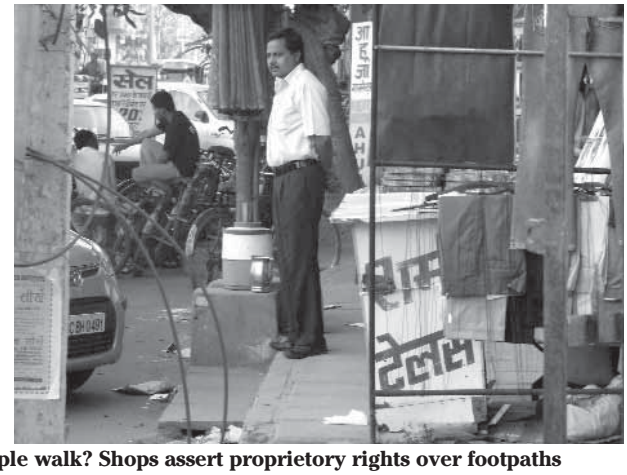
Seelampur- Zaffrabad area, Govindpuri and Mother Dairy have very poor walking environment. There are no shades or facilities like drinking water kiosks, telephone booths, food kiosks, or resting points. The bus stops/shelters are rarely used. Though Seelampur is well serviced by buses and the metro rail the access and egress to and from the public transit services is very complicated.

Mother Dairy, Patparganj: Clearly no one believes this space is meant for walking

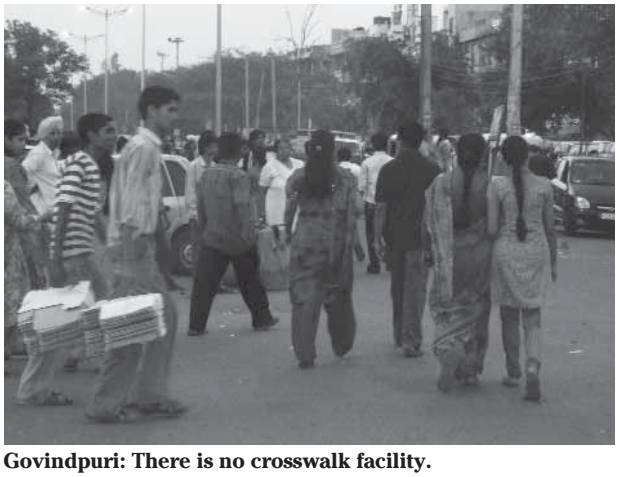
Too many obstructions in Govindpuri: The Guru Ravidas Marg in Govindpuri and Mother Dairy areas are often encroached upon by the owners of the adjacent shops. Also, there is encroachment by vegetable sellers. These encroachments may be of temporary nature but they are "permanent". There are also permanent encroachments on the stretch in front of Majeedia hospital in the vicinity. Signages and transmission poles and transformers are located in the middle of the footpath. This reduces the circulation area. The tiles on the stretch are either missing or broken indicative of poor maintenance. The absence of facilities like public toilets result in footpaths being used as urinals. The wastes from the bins spill onto the footpaths and roads. The footpath other than being discontinuous is heavily encroached, soiled and dumped and cannot be used by pedestrians.

Mother Dairy near Patparganj: Walk Where?

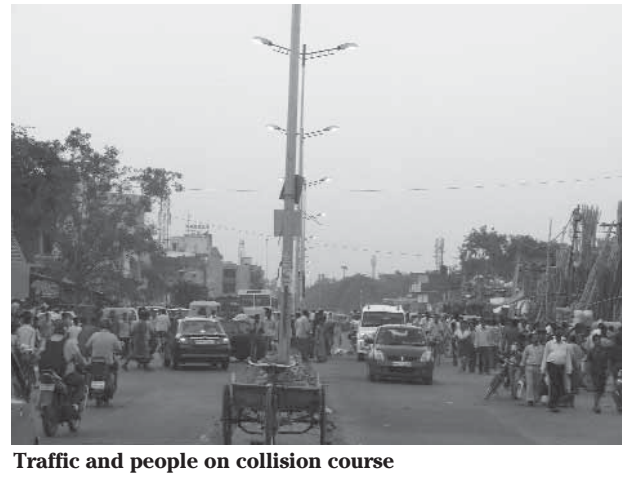
Commercial areas under severe strain: The central business districts and prominent commercial areas like the Connaught Place and Lajpat Nagar have enormous pedestrian traffic and have strong potential to pedestrianise. Assessment of these sites show mixed results.



Govindpuri: Mennequins pose on footpath: where will poor people walk? Shops assert proprietory rights over footpaths



Govindpuri: There is no crosswalk facility.



Traffic and people on collision course

PARADOX

To understand the contrast between poor neighbourhoods and the elite localities in Lutyen's Delhi a trip was made to Aurangzeb Road. The irony hits hard. In Govindpuri where about 100 persons walk per five minutes during peak hour has footpaths that barely exist. But in Aurangzeb Road lined with ministerial bunglows, where only 3 persons were counted walking per five minutes during the morning peak hour, has well designed and spacious footpaths. This shows complete policy disconnect between urban planning and reality of the city. Planning does not keep people within focus.

Aurangzeb Road: Ample space to walk but no walkers

Govindpuri: Intense demand but no space

In Connuaght Place, the New Delhi Municipal Council (NDMC) has made a lot of efforts to improve the pedestrian infrastructure and make the service continuous in many stretches. But this improvement is not uniform. The improvement in Ram Krishna Mission Marg in the Connaught Place area is noticeable.

The Stretch near Arthur Hailey lane too offers a great environment to the pedestrians with broad and clean walkways and shady trees. The Tolstoy crossing has well designed crosswalk facilities with traffic islands that can be used as pedestrian refuge islands.

These facilities have kerbed ramps to access the crosswalk facilities. Connaught place has wide sidewalks often more than 3 meters that are now easily accessible by all. But often these sidewalks have poor paving especially on the Kasturba Gandhi Marg between British Coucil Library and the Cannuaght lane. Also the lighting needs to be improved on these stretches. In Janpath, the attractive paving on the sidewalks near the market has created a very congenial pedestrian ambience.

None of these however have a disable friendly infrastructure except at the bus stations. The absence of a sidewalk facility between the Connuaght lane and Scindia House is a problem. The pedestrians are compelled to walk in modal conflict on this stretch. The sidewalks are discontinuous and there are no ramp facilities for accessing them as the height of these footpaths at points are more than 18 centimeters and therefore difficult to negotiate. The guarded rail that creates a confined environment further discourages the pedestrians from using them.

Hawkers, poor maintenance, and parking of vehicles on the sidewalks plague Connaught Lane. In fact, in many areas in Connaught Place the wide sidewalks that are more than 5 meters wide have been converted to bituminous tract to accommodate car parking

Lajpatnagar is a popular shopping area in South Delhi. It's footpath has been heavily encroached upon. In the absence of good sidewalk and crosswalk facilities pedestrian often find it difficult to cross roads. The paving is poor and of narrow width. Footpaths are poorly maintained. The crossing is also a problem here.

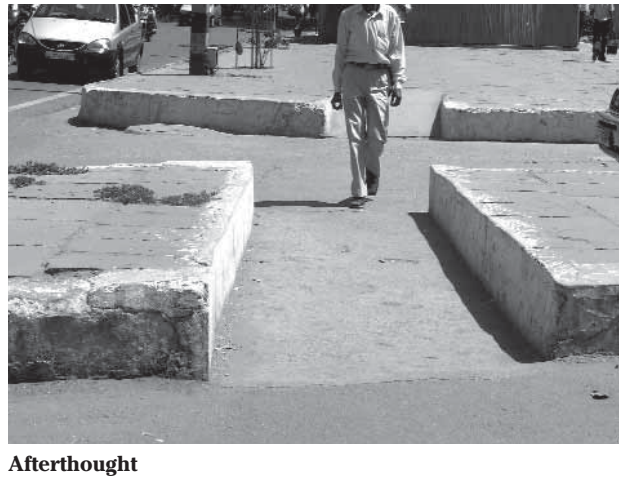
However, recently, a stretch of about 1.5 kilometers has been pedestrianised with one way movement of motorised vehicles. This small pedestrian precinct has reduced modal conflict. Also improvement in enforcement compels the motorists to

Ramakrishna Marg, Connaught Place: Resurgence – Clear through route of 1.5 meters and continued sidewalks

Crossing at Tolstoy Marg: Well designed cross walk

Janpath: Congenial atmosphere

British Council, Connaught Place, Retrofitting change



Afterthought

Lajpat Nagar: Jostling to find space

Connaught lane: Sidewalk continuity disrupted by a road near a bus stop

Poor maintenance in front of Scindia house

Unplanned hawkers

yield to pedestrians and reduce the vehicle speed. This development has helped Lajpat Nagar to score well.

This has increased the use of non – motorised modes like rickshaws. However, beyond the pedestrazinised area, it is difficult to cross the roads with zooming vehicles and the motorists rarely yield to the pedestrians.

The key business and commercial areas like Connaught Place and Lajpatnagar that are also accessible by public transport have the potential to pedestrianise with careful planning and adequate infrastructure. Global experience shows that pedestrianisation improves business and profits in the targeted areas.

Walkways around hospitals do not address specific needs of ailing visitors: The pedestrian ways around the All India Institute of Medical Sciences that cater to a large number of ailing people visiting the hospital presents a dichotomous situation. The design of the pavements around the hospital has improved according to the guidelines. But the cloverleaf flyover that has been created in its vicinity has disrupted at-grade continuity in its proximity, and increased distances for the ailing visitors approaching the hospital from the side of the Ring road. At least in one direction the vulnerable population has to use the subways that are not appropriate alternative to at-grade crossings. The Ring road has become so wide and heavily motorized that at grade crossing is now nearly impossible. The cloverleaf flyover created to allow continuous flow of traffic has completely severed the connection.

Barred from sidewalks people are forced to walk on roads

Scindia House: Zebra crossing leads to obstruction

Survey brings out that these sensitive areas will require a special focus walkway designs and facilities – especially in terms of keeping the direct routes from all access points at grade. If subways become absolutely essential in vicinity of the hospitals it is important to ensure that these are hundred per cent handicap friendly with supportive tools and facilities.

The footpaths are discontinuous. Near the Yusuf Sarai market, the construction of metro rail has eaten up the space allocated for pedestrians and the heavy pedestrian volume is accommodated within a narrow strip of 1.3 meters – 0.90 meters. People are compelled to walk in modal conflict. In an area that generates almost 190 –200 people every five minutes during peak hour, the narrow width of footpath does not comply with the requirement that demands at least a five meter wide sidewalk. The cloverleaf at this junction has put an end to all pedestrian connectivity between the AIIMS area of Aurobindo Marg with that of the Delhi Haat area. The cloverleaf, designed to facilitate the movement of cars has forced the bus commuters to walk an extra 200 meters, converted all walking trips from AIIMS area of Aurobindo marg to that of the Delhi Haat area to motorized trips or have compelled the poor people to walk in a dangerous environment on a narrow 0.9 meter wide median strip. This has not only divided the urban space but has exemplified the inequity in allocation of road space. In the vicinity of the two big hospitals of Delhi, the infrastructure for the disabled is almost absent on the sidewalks except at the bus stops.

Poorly engineered footpath: The stark evidence of neglect is poor engineering design. Evidently, all city public works and municipal departments follow the guidelines of the Indian Road Congress. But these guidelines are not adequate. One of the key design lacunae is the lack of clarity about the height of the footpaths. In fact, there are no clear IRC guidelines on the height though internationally it is accepted that the optimum height should be not more than 12-15 cm. In many locations very high footpaths have been noticed without proper gradients. Walkers find such pavements difficult to use and are forced to to walk on the bituminous track. The officials justify this on the grounds that the height helps to prevent illegal parking of motorized vehicles. But this compromise on the

Yusufsarai near AIIMS: Width of footpaths reduced during metro construction to accommodate motorised vehicles

height cannot be the alibi for poor enforcement of rules to stop motorized vehicles from encroaching upon the pedestrian space. Also in many areas width of the footpaths has been arbitrarily reduced for road widening.

People prefer to be at grade and cross with the help of pelican signals. But increasingly authorities are promoting grade separated facilities — foot over bridges, sky walks and subways. As vehicles begin to get priority through seamless signal free roads pedestrians are pushed over and under the roads. But this is becoming increasingly difficult in main arterial roads where more lanes are being added for motorized traffic. Pedestrians have to cross more than two lanes of motorized vehicles in one direction. This creates extremely hostile and unsafe conditions.

Zaffrabad - Seelampur: Cars take over poor peoples' space

Dumpyard

Absence of disabled friendly footpaths: This is one of the most serious weaknesses noticed in nearly all sites barring the BRT corridor. This issue has also been highlighted with utmost urgency by the Delhi based group Samarthyam that has surveyed some parts of Delhi from the perspective of the disable. Among all the sites surveyed by CSE only BRT corridor has well surfaced sidewalks that range between 2-5 meters, that are also disabled friendly.

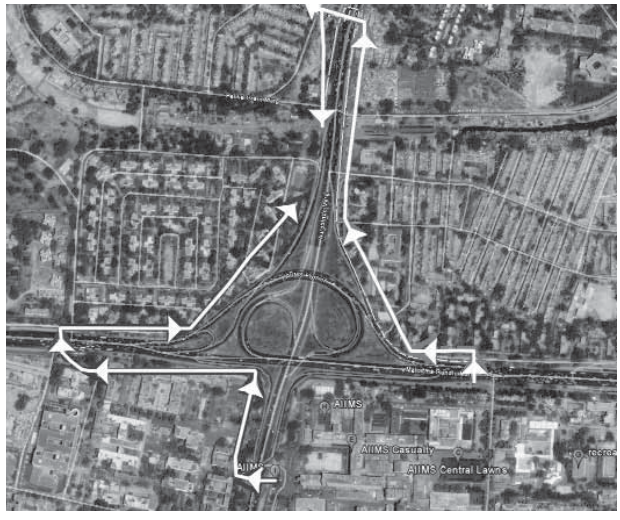
Severance of cityscape: It is not often understood how car centric infrastructure – flyovers and cloverleafs completely severe neighbourhoods and increase distances. This is starkly evident in AIIMS area where a cloverleaf flyover has been constructed. The sides are not easily accessible through direct shortest route. In fact the assessment shows that while it took much less time to walk across from AIIMS to Delhi Haat before the clover leaf flyover was constructed, it now takes nearly half an hour and this requires unfriendly passes through subways and circuitous routes (See map: *Cloverleaf flyover increases walking distance*).

Shrinking space and jay walking: There is no law today that prevents reduction in space for sidewalks for road widening. Decision on width and height of sidewalk is arbitrary. The width is very narrow in many places. These are also severely obstructed. Spaces have also been taken up by the illegal markets and hawkers. As the direct and at-grade crossing is blocked by the barricades for motorized traffic, often people are seen jay walking.

Jay walking is a common sight. People simply walk on the roads and cross in total conflict with the motorized traffic. Disruption of the shortest direct route caused by

CLOVERLEAF FLYOVER INCREASES WALKING DISTANCE

Before AIIMS Clover leaf flyoverwas built it was possible to take the shortest direct route to Delhi Haat. But....
Source: Google Map



....after AIIMS Clover leaf flyover has been built walking distance has increased manifold.
Source: Google Map

road widening, flyovers and signal free traffic systems have forced more jay walking. The four lane outer ring road with three flyovers on Bhakti Vedanta Marg near Nehru Place and Kalka temple has spelled havoc for the pedestrians. This signal free stretch is very difficult to cross. Cross walk facility is very poor on this Public Works Department (PWD) road. The public agency is constructing two foot-over bridges but they are not along the desired lines of the pedestrians and the complicated structure discourages them from using it. Moreover, they have invaded into the sidewalk with little or no circulation space left. The exposure to traffic is very high and unsafe. The absence of traffic signals increases the waiting period for the pedestrians and the jaywalkers risk their lives. These foot overbridges are also not disabled friendly.

There are also reports of motorised invasion of pedestrian subways as near Haldiram that reflect amazing ingenuity on part of the two-wheeler riders.

Pedestrian space surrendered to vehicles: Encroachment of vehicles on the pavements for parking is chronic. Parked cars are taking away nearly the entire

Jay walking near Nehru Place (Bhairav Mandir)

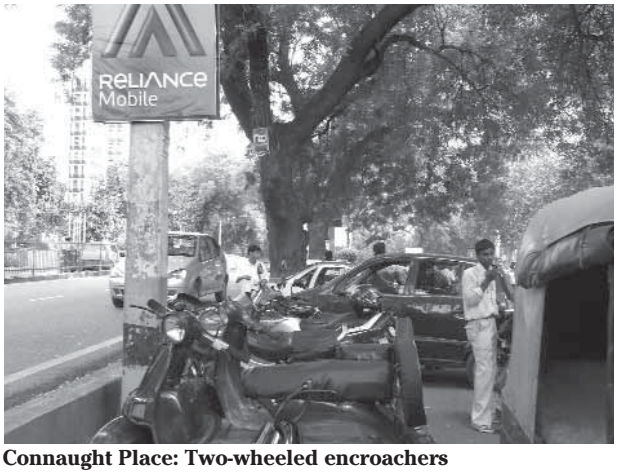
Jay walking near Connaught Lane bus stop: Illegal cross over

walk space and forcing people to walk on roads in sheer modal conflict. As there is no priority accorded to pedestrian, authorities do not care to enforce laws to prevent motorized traffic from filtering into the walkways. This is rampant even in the dedicated pedestrian way on the BRT corridor. Vehicles are entering the forbidden zone with impunity compromising the integrity of the system. Car centric development is also making infrastructure more expensive. Money required to construct a flyover is around Rs. 250 – 500 crores. But at-grade pedestrian crossing facilities cost the least only a couple of thousand rupees. Other pedestrian facilities can upto Rs. 1 crore per kilometer.

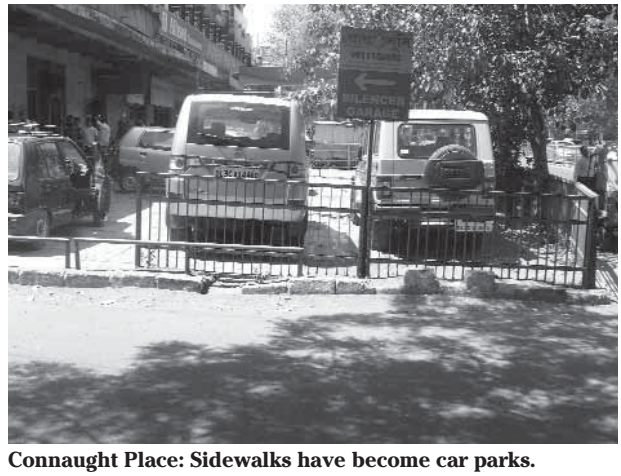
Walking in modal conflict with motorized traffic: The modal conflict refers to the number of people walking in the carriageway along with other motorized modes. This is an important issue in walkability as this determines the risk of accidents.

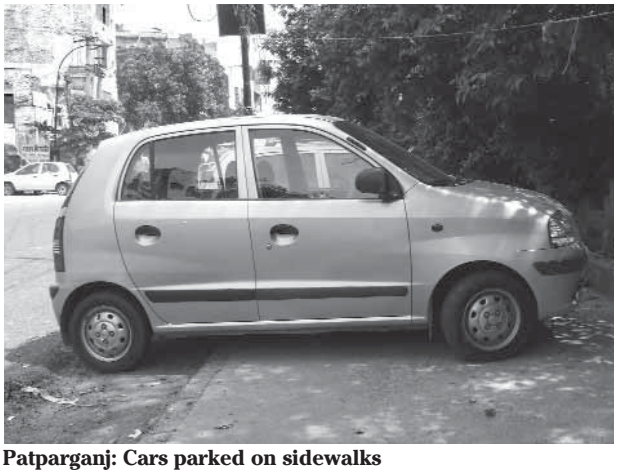
Nearly in all sites pedestrians are being forced to walk in total modal conflict with motorized traffic increasing risk of accidents. Nehru place has high modal conflict due to inaccessible sidewalks and discontinuous footpaths and also the motorists do not yield to pedestrians.

As footpaths begin to shrink and disappear people begin to walk on the roads. The absence of quality pedestrian infrastructure and poor environment compels

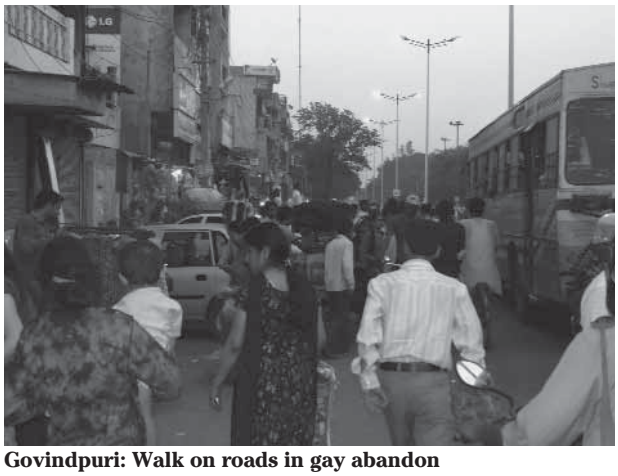


Connaught Place: Two-wheeled encroachers


Connaught Place: Sidewalks have become car parks.


Patparganj: Cars parked on sidewalks


Alaknanda: No place to walk



Govindpuri: Walk on roads in gay abandon

pedestrians to walk in conflict with motorized traffic. This also makes the crossing environment extremely dangerous.

At Sai Chowk in Patparganj pedestrian jaywalk as no time is allocated to crossing. This was observed on the road to BALCO market where traffic is heavier. Chittaranjan Park and Alaknanda have limited sidewalks where pedestrian walk in conflict with other modes. There is a pelican signal near the Alaknanda market to serve the shopping centre. Heavy traffic of cars in these localities makes it difficult for the pedestrians to walk to the market. This road is also heavily used by through traffic making the residential areas extremely vulnerable.

In Cannaught place and ISBT better enforcement that compels a motorist to yield to a pedestrian has enabled them to score higher.

Poor environment for walking. User survey expose disenchantment: The user opinion survey was carried out in selected locations along with the third party assessment done by the CSE and its volunteers. User survey brings out clearly how dissatisfied the pedestrians are in most of the locations under survey. The main points of complaints include uneven surface, potholes, urinals, height of the pavement that force them to walk on the road. Interestingly, sometimes pedestrians have rated some locations better than the third party inspection by CSE because they are so used to the state of affairs that they are not conscious of demanding anything better. However, pedestrians on the BRT lane are very happy with the sidewalks and have commented how their daily drudgery of walking has changed because of the improvement. But they are not very satisfied with the cross walk facilities as the signals are not working properly.

Sai Chowk in Patparganj: Sprint to cross.

Where is footpath?

Lajpat Nagar: One way traffic near market

AIIMS: Obstruction even on a subway

6: WALKING: A GOVERNANCE CHALLENGE

India has plethora of laws and bye laws related to road safety, infrastructure, and urban planning that have bearing on pedestrians. But these regulations are extremely fragmented, diffused and not strong enough to protect pedestrian rights, and space. These laws do not add up to create any integrated framework either at the national or at the city level to meet the intended objectives of protecting walkers, walking space and promote pedestrianisation of city centres.

6.1. National policy framework for pedestrians

The National Urban Transport Policy of the Union ministry of urban development has stated the principles for pedestrians and pedestrian infrastructure in transport planning. It recognizes that non motorized transport including bicyclists and the cycle rickshaws and the pedestrians are environment friendly and cause zero pollution and therefore have to be given their due share on the road. The safety concerns of cyclists and pedestrians must be addressed by encouraging the construction of segregated lanes for bicycles and pedestrians (See box: *National urban Transport Policy on walking*).

The ministry has also issued circulars to the state governments in 2007 stating that all roads should have provisions for pedestrians along with non-motorised

WHAT ARE PEDESTRIANS SAYING?

How do pedestrians feel about their walking environment? The Right to Clean Air Team of the Centre for Science and Environment along with the volunteers walked to talk to the walkers and understand their perception. The team conducted survey on the sidewalks and crosswalks of locations selected for this study. Pedestrians were quizzed on a wide range of issues including safety, maintenance, design of the footpaths, and comfort level of walking among others. This has brought out the deep rooted concerns of walkers. It is interesting to observe the co-relation between the people's perception and the results of the third party inspection carried out by the team. In many cases there is strong agreement between the nature of peoples' reaction and the ranking of the location. More intense anger has been noticed in places that also have scored poor ratings. But sometimes people also get used to having what they have and they begin to accept the situation as was noticed in some residential areas. However, there is a clear pattern in people's perception about the state of walking facilities.

SIDEWALK FACILITIES

What do people think about the design of the footpaths?

- **Nearly all pedestrians on the BRT pedestrian path have agreed that the re-engineered design especially the height of the footpath makes it easily accessible and comfortable for people from all walks of life and age groups. The sidewalks are continuous. They do not have to get off and on the footpath as they used to before the corridor was constructed.**

- **In commercial areas of Connaught Place and Lajpatnagar, more than one third complained about accessibility. The pedestrians were unhappy about the discontinuous sidewalks especially near BCL and Cannaught lane. The situation is worse at Yusuf Sarai, near AIIMS where 67 percent of the people said the railing barricade was an obstruction for them to get on to the footpath. In Interstate bus terminus (ISBT) 58 percent of the people complained about footpath height especially towards the bus terminal side. Though the railings have been removed the height of the footpath remains an issue for the pedestrians.**

- **In Govindpuri, and Mother Dairy near Patparganj, where the footfalls are relatively higher than other areas, the facility provided by the city authorities cannot be availed by the pedestrians due to the sheer height of the footpaths and their discontinuous nature. In Govindpuri 82 percent of the people surveyed have complained about the heights and in Mother Dairy about 45 percent of the people said that it was difficult for them to access the newly constructed footpath that measures about 30 centimeters in height.**

How safe are the sidewalks for walking?

- **The design and tiles of the sidewalk should be such that it enables the pedestrian to walk briskly unconcerned about the condition of the footpath. Often the cracked pavings, steps, obstructions cause tripping or falling. The presence of steps, or excessive cross fall causes tripping or falling. While 76 percent of the people in Seelampur and Zaffrabad area complained of falling and tripping due to missing tiles and uneven paving, 63 percent of the people in Govindpuri and 45 percent in ISBT complained of tripping and falling due to lack of maintenance of footpaths.**

- **Walkers on the BRT corridor have found this to be relatively safe. Interestingly, even though the state of footpaths in the residential areas have scored poor on third party inspection walkers in Chittaranjan Park and Alakananda area, Patparganj and Lajpatnagar have rated them medium as they have got used to using them.**

Are pedestrians able to walk in comfortable pace? Is there enough space?

- **A large number of people have complained that there is simply not enough space to walk. Footpaths need effective width. In Connaught place 45 percent of the people have complained that they have problems during peak hours, 65 percent of the people surveyed in Govindpuri have grumbled that footpaths do not have enough space. 63 percent of the Pedestrians in Mother Dairy complain about similar problems and 55 percent in Seelampur and Zaffrabad also have similar grievances. On the pedestrian way in the BRT corridor, 67 percent of the people surveyed do not feel impeded by other pedestrians. But 20 percent have complained that they feel impeded by other modes during peak hours when two wheelers conquer their space "thinking it to be their birth right" as one pedestrian observed. In ISBT 54 percent have said that they have no issue with the width but where toilets have been constructed on the footpath, it constricts their pathway.**

- **It is interesting, that even in the BRT corridor pedestrians have complained that during peak hours when buses arrive at the stations and commuters alight and start walking on the footpaths they often collide with each other due to the sheer volume of pedestrians. Similar complaints were registered in Cannaught Place were 45% of the people complained that they were not able to walk without colliding with each other especially during the peak hours.**

- **Nearly 80 percent of the people in Chittaranjan Park and Alaknanda area and 66 percent of the people surveyed in Lajpatnagar complained against narrow footpaths. Only recently, a small stretch in the Lajpatnagar market area has become pedestrian**

.....WHAT ARE PEDESTRIANS SAYING?

friendly with one way traffic and roads blocked for movement of cars adjacent to the market and there is ample space for walking. But pedestrians want more suitably designed sidewalks for walking without colliding with other non motorized modes and pedestrians. About 50 percent of the people in Delhi haat and AIIMS area want wider footpaths as they sometimes feel that they are impeded by other pedestrians while walking.

Are footpaths strewn with Obstructions?

- Pedestrians are very unhappy about the temporary and permanent obstructions that exist on the sidewalks and makes walking difficult for them. The highest numbers of complaints were registered in Govindpuri (nearly 100 percent) where the sidewalks are completely engulfed by the adjacent shop owners, hawkers, potholes, dumps etc. The new facility in Mother Dairy (69 percent) of the people also suffers from similar symptoms. Seelampur also has 55 percent of the people complaining against obstructions.

- On the BRT corridor people at Ambekarnagar complained about two wheelers taking away their space. Cars are also found parked on sidewalks in the BRT corridor and also the adjacent shop owners (the motor mechanics) at Ambedkarnagar have encroached on the adjacent 5 meter wide footpath. A disabled pedestrian who had been interviewed also complained about encroachment of the shop keepers on this facility.

- In the residential area of Patparganj, Chittaranjan Park and Alakananda people have complained that parked cars and hawkers on the footpath obstruct their ways. In Chittaranjan Park house owners have barricaded pavements. Nearly 40 percent of the people have complained about temporary obstructions. Similar complaints were common In the commercial areas of Connaught Place and Lajpatnagar.

Are footpaths well maintained and clean?

- The BRT corridor received thumbs up from 93 percent of the people surveyed who said that the new facility (with its cleanliness and maintenance compared to other areas of the city) is encouraging for the bus commuters to walk up to the station. In Connuaght Place 74 percent of people found footpaths well maintained and clean. In Chittaranjan Park and Patparganj areas over 40 percent of the people surveyed find the area clean.

- In ISBT no body has agreed that the area is always clean because of stinking toilets and broken footpaths. The worst areas on maintenance and cleanliness are Govindpuri (77 percent), Mother Dairy (80 percent) where the new facility has already been stained and Seelampur (62 percent). Over 60 percent of the people in AIIMS have also complained about the footpaths not being maintained and are unclean.

- Safety from crime, physical assault and eve teasing is another major parameter that concerns pedestrians. While Govindpuri, Mother dairy and Seelampur top the chart of being perceived as unsafe, BRT Corridor, Connaught place, AIIMS, Nehru Place seems to be relatively better. This is the perception and not corroborated by crime data.

Is it a pleasure to walk on the footpaths?

- While the BRT corridor has had 87 percent of the pedestrians surveyed nod their head in affirmation that the facility provided is 'always' wonderful and enjoyable except the rampant onslaught by the two wheelers during the peak hours. In Lajatnagar 45 percent of the people agree that the situation has improved in the pedestriansed stretch. In Connaught Place, people walking on the Ramakrishna Marg are quite happy with the newly built sidewalk facility and find it a pleasure to walk on the footpath.

How well lit are the footpaths?

- People on the BRT corridor are generally happy with the street lighting and they do not have problems walking during the night. Such complaints were very high in Mother Dairy and Seelampur Zaffrabad area. Uniquely in Govindpuri, people were less critical about this issue. The street light poles have just been placed on the central verge by the PWD. More light from the two poles on the road has made it easier for them to walk on the left side of the yellow painted line on the road.

CROSSWALK FACILITY

Do people find it difficult to access the crosswalk facility?

Unless a safe crosswalk facility is provided to the pedestrians, there will be few walkers on the road except for the captive pedestrians. The risk of getting hurt increases with the increase in time of exposure while crossing the roads. Most vulnerable are the children, women and senior citizens. The motorists behavior towards pedestrians crossing the roads is another important aspect that deters or encourages people to walk.

- Questions were asked to understand whether the designed facility were along the desired lines of the pedestrian. In most places the crosswalk facility are at grade except for the major arterials and commercial centers where there are subways and foot over bridges to crossover. It came out in the survey that often the pedestrian tends to avoid the designed facility as it may

cause detour and the person prefers to jaywalk taking the shortest route risking his life.

- People in Connaught place (over 40 percent of the people) find it difficult to access the crosswalk facility. The Tolstoy Marg crossing, which is at grade, has good design facilities and the traffic island too is a good pedestrian refuge island. Crossing becomes difficult on the stretch between British Council to Scindia House. The subway constructed by NDMC remains open only till ten o'clock in the night. This essentially legalizes jaywalking and encourages people to jump the railings to cross. There is tremendous jaywalking near the bus stop on the Connaught lane where people jump over fence to cross over. Also, at-grade crosswalk facility at the point where K G Marg meets the inner circle has obstructions.

- In Nehru Place 57 percent complained about accessibility and in Seelampur and Govindpuri 62 percent and 100 percent of the people had issues with accessing the crosswalk facility. In Govindpuri, though crossing is at grade there is no designated facility for crossing over. People cross primarily at T-junctions or intersections but also the absence of facilities and encroachment of sidewalks (making walking difficult) compels them to cross from wherever they feel like. In Seelampur area on the GT road there is subway, which is hardly used and in Zaffrabad it is very difficult for the vulnerable population to cross the roads.

Do they have enough time to cross the roads?

- In the BRT corridor while 87 percent of the people said that there was enough time to cross the roads, 13 percent of the people who were in the age group 45-55 years felt that the time allotted was not sufficient for them to cross the roads. Experts say that an old man can walk at a speed of 1metre/second. On the BRT corridor the exposure time was high as 73 percent of the people complained that they have to wait for a long time to cross the road if they have to use the designated facility. This shows the exposure time for the pedestrians on the corridor is high. The same also holds true for Govindpuri where people in absence of designated crosswalk facility, are either waiting for long to cross the roads and they also do not find enough time to cross the roads and therefore have to wriggle through the traffic at a breakneck speed.

- In Delhi Haat, there is a subway to cross the roads towards INA market. People find it cumbersome to access the subway. People have complained that do find sufficient time to cross the roads, have to wait for long to cross the roads at grade and are jaywalkers. Similar phenomenon is also observed in Nehru place.

- In the residential areas of Patparganj and Chittaranjan Park over 50 percent of the people have said that they barely have time to cross the roads. These places need traffic calming measures to increase the crossing time for the pedestrians as there are no traffic signals. The first right of way should be given to the pedestrians.

- In AIIMS and Connaught Place people need more crossing time where the facilities are at-grade. People also encounter obstruction while crossing the roads. Vehicles are parked on zebra crossings or the zebra crossing lead to obstructed sidewalks with protruding buildings or transmission poles or street lamps. Obstruction is a common problem in all the surveyed areas.

- On the arterial roads grade separated facilities have been constructed to reduce exposure to motorized modes. However, pedestrians prefer at grade facilities. Over 90 percent have complained that they take quite long to cross the road using the subway and prefer to jaywalk. In Seelampur jaywalking from the metro station is a common phenomenon. About 87 percent have complained that they prefer to jaywalk or if they are at all bothered about safety they would use the signalized intersection below the fly over as the one ahead of the fly over makes it difficult for them to cross the six traffic lanes.

- Pedestrians have complained that motorists in most places do not at all yield to pedestrians except for at Cannaught Place especially near Janpath. This shows lack of strong enforcement. In Lajpatnagar where traffic police is always seen on Veer Sarvakar Marg and Feroze Gandhi Marg, motorists are seen yielding to pedestrians. In all other places strong enforcement is required to regulate the motorist behavior and make pedestrians safe.

- In BRT corridor 73 percent of the people surveyed said that if they cross the road using the designated crosswalk facility they feel safe. In commercials areas like Lajpatnagar 65 percent of the people are happy with crossing facility as they feel one way traffic makes it easier for them to cross as they then have to care for vehicles coming from one side. At the Interstate bus terminus, 64 percent of the people feel safe using the subways and foot-over bridge. Over 80 percent of people in Govindpuri and Seelampur do not like the crosswalk facility.

- In Govindpuri people do not have sufficient time to cross the roads and they have to wait for long to cross the roads. This increases the exposure time for pedestrians. People here use at grade facilities for walking. In Seelampur, 51 percent of the people have complained that they have to wait for long to cross the roads and over 30 percent of the people barely find time to cross the roads indicating high exposure to traffic. When the waiting time increases the tendency to jaywalk becomes high and so does the risk of hurting themselves.

WALKWAYS IN BANGALORE

The footpaths in Bangalore are not available on all streets and wherever they exist their width varies from 0.5-2.5m. The through route on these footpaths are not free of obstruction and are strewn with street furnitures and other utilities (like electric, water supply, telephone), street lights, transformers, sign boards, roadside vendors, bus shelters. This further reduces the effective width for walking. Though they follow the guidelines of the Indian Road Congress (IRC) for designing the footpaths, they are clearly not adequate to address the needs. The Right of Way (RoW) constraints the footpath width. It is very common to find footpaths with 0.5- m width. The narrow widths make walking uncomfortable and the pedestrians are forced to use the carriageway, thus exposing them to greater accident risks. The concept of dead width is almost absent in designing the footpaths.

The city development plan of 2006 for Bangalore has proposed mixed landuse. This will require wider sidewalks with amenities as mixed landuse increases pedestrian volume. The footpaths also need to be properly designed with kerbs, zones for street furniture, through routes and frontage with a shy distance from the traffic. Signages for both pedestrians and motorists need to be posted but no more clutter.

Bangalore authorities had started a scheme few years back that a person who identifies a pothole on the roads along some sections would be awarded money. But the footpath potholes are never highlighted. Even in the current drive to improve roads by the municipality, footpaths are ignored.

The crosswalk facilities in Bangalore are also created as per the IRC guidelines. But the absence of controlled crossing causes problems for pedestrians as they have to cross roads based on their judicious decision. This makes crossing unsafe. The IRC guidelines for midblocks need to be revised as waiting time is not defined and there is ambiguity in the concept.

PEDESTRIANS CONQUER FAZILKA

In a small town of Fazilka in Ferozpur district of Punjab a car-free zone has been created in the Ghanta Ghar market that is enforced between 10 am and 7 pm . Architect Bhupinder Singh has played an important role in designing this project. This has found a lot of support from the local shoppers as this has led to appreciable increase in business in the area. Pedestrianisation has not led to any drop in business.

Vendors in the area are actually happy as the sales have soared. Vendors and customers are more relaxed, as they do not have to compete for space with parked vehicles. A town spanning 10.29 sq km, Fazilka can easily become a pedestrian's city with vehicles used only to transport goods. Cycle rickshaws have become ecocabs in car-free Fazilka. Ecocab centres work along the lines of dial-a-cab service. There are five such centres catering to the five different unions of the cycle rickshaw pullers in Fazilka.

MEETA AHLAWAT / CSE

Fazilka: car banished

transport and bus rapid transit system. These circulars have also asked for Comprehensive Mobility Plan that gives priority to pedestrianisation and public transport.

In January 2008 the Union ministry of urban development has also written to all principal secretary and secretary of urban Development, transport and public works departments raising the concern over pedestrians and the need for intervention. It states that the roads are increasingly becoming unsafe for the pedestrians and non-motorised transport because these modes have to share the same right of way with the motorised modes. This is drastically reducing the share of pedestrians and non motorized trips. Even the flyovers which are being constructed do not reflect the needs of pedestrians, cyclists and public transport. State governments have been asked to issue necessary instructions to the concerned officials and agencies to address the safety and environment concerns of urban transport. (See box: *Missive on walking*).

Within this national policy framework the Jawaharlal Nehru Urban Renewable Mission (JNNURM) a programme of the Union ministry of urban development for cities with more than million population offer the opportunity for implementation. Under the JNNURM programme the cities are required to develop their respective city development plans (CDP) to identify the infrastructure projects that can be eligible for central and state assistance provide the opportunity to build pedestrian infrastructure.

Even though this is only a nascent beginning a cursory review of some of the CDPs that have been developed by various cities shows that in most cases pedestrian ways are taken as implicit in the overall road infrastructure planning for the city (Box: *City development plans: An opportunity for pedestrians*).

Cities like Delhi, Ahmedabad, Hyderabad, Pune, Bangalore and even smaller cities including Faridabad and Nanded have stated the unsafe conditions for pedestrians and have proposed schemes for pedestrian ways. Delhi has proposed pedestrianisation of its central business district of Connaught Place. Even Ahmedabad, Hyderabad and Bangalore have earmarked spaces that will be made vehicle free zones in addition to the plans of creating well designed footpaths along major roads.

Nanded, a small town in Maharashtra has taken the lead in designing high end pedestrian paths. The Union ministry of urban development has already sanctioned projects for pedestrianisation at a cost of Rs 94 crore that includes Nanded (Box: *Will Nanded be our little "Copenhagen"?*)

It needs to be seen how JNNURM programme can be leveraged to serve the interest in cities. In fact, the recent stimulus package for the bus industry announced under JNNURM presents the opportunity. This one time scheme that offers central assistance to buying of buses in cities is tied to conditional reforms in the transport sector. To be able to access this fund the city governments will have to give commitments to initiate institutional reforms for public transport management and implementation, create dedicated funds from revenues from variety of sources including higher taxes on personal vehicles and diesel cars, implement parking policy as a car restraint measure among others. Pedestrian infrastructure and rights should also be linked with this programme as augmentation of bus transport will also increase the pedestrian volume.

It is however more complicated to administer pedestrian space and rights in a city.

India has plethora of laws and bye laws related to road safety, infrastructure, legal rights and urban planning with bearing on pedestrians. But these are fragmented, diffused and not strong enough to protect pedestrian rights and space.

NATIONAL URBAN TRANSPORT POLICY ON WALKING

- Cycle tracks and pedestrian walkways are not integrated in Transport plans in the initial period and needs to be done in consultative process with all stakeholders.
- Under JNNURM the Union government would facilitate pedestrian and NMT infrastructure by giving priority to construction of cycle tracks and pedestrian walkways to encourage the usage of NMT modes. Also a strong NMT network would increase access to public transit modes.
- Central government would support the construction of safe pedestrian crossings at busy intersection and at high traffic corridors.
- To increase walkability and NMT usage, pedestrian amenities like drinking water facilities, rest stations for bicyclists along NMT corridors, creative facilities like shade giving landscape, would abet arresting adverse weather conditions.
- Encroachment on footpaths also deters pedestrians from walking along footpaths. Activities on footpaths such as street vendors must be properly controlled to secure pedestrian safety.
- Central government would also support formulation and implementation of specific "area plans" in congested urban areas that would propose appropriate mix of various modes of transport, including exclusive zones for non – motorized transit.
- The union government would also take up pilot projects in a sample set of cities to demonstrate the improvements that are possible through improved usage of cycling and showcase it for other cities to replicate.

MISSIVE ON WALKING

Ministry of urban development in its missive on January 2008, to the state governments has asked for intervention to protect and promote pedestrian traffic.

"Whatever roads are being built, new or widened, enough provision should be made for dedicated paths for pedestrians and cycle users with properly designed pedestrian and cycle paths. Where it is not possible to provide dedicated paths for pedestrians and cyclist, traffic calming measures need to be adopted to limit the maximum speed of motorised vehicles to 30 kmph or so. Even the flyovers which are being constructed should have proper design for taking care of movement needs of pedestrians and cyclists."

"When State Governments develop IT/BPO Towns, Satellite Towns, SEZs, etc. these proposals must make provision for both cycle tracks and pedestrian movement as viable alternatives to use of personalised motorised modes. State Governments also need to adhere to UDPFI Guidelines, 1996 (MOUD) which prescribes norms and standards for urban roads design considerations including sidewalks (footpaths) and cycle tracks."

"State governments have been asked to issue necessary instructions to the concerned officials and agencies in this regard to address the safety and environment concerns of urban transport."

A plethora of rules exist without any centralizing legislation that ties them all. There is no policy to give priority to pedestrian needs.

It is important to understand the existing regulations related to the pedestrians both at the central and the local levels. The existing laws can be broadly grouped as follow:

- Rules directed at the motorist to prevent them from causing accidents and harm to pedestrians.
- Laws directly related to pedestrians
- Traffic rules that regulate pedestrian movement
- Guidelines for urban roads and pedestrian infrastructure and protection and Master plan guidelines on urban planning addressing the pedestrian needs, and impose penalty for violating traffic rules.

CITY DEVELOPMENT PLANS: AN OPPORTUNITY FOR PEDESTRIANS

City Development Plans of some cities have highlighted the perils of pedestrian infrastructure and even proposed some plans of improvement. This component will have to be strengthened with clear targets and guidelines for effective implementation.

DELHI

City development plan of Delhi has highlighted the problem of lack of pedestrian facilities, improper road design, and lack of consideration for disabled and pedestrians. The Vision statement and gap analysis mentions that more than 60 percent of daily trips in the city have at least one part of the journey as pedestrian. Pedestrians are most vulnerable road users, and their safe movement is of paramount importance and their needs to be given priority on road.

It has proposed to strengthen footpaths and build foot over bridges. It has given special plans for Connaught Place and the walled city that are important commercial centers as well as sites of heritage importance. To retain the character of these sites, special schemes for redevelopment have been proposed. These include the use of non-motorized modes, equitable use of space on road and priority to pedestrians, efficient use of existing infrastructure – removal of impediments – including enhancement of road infrastructure and provision of efficient parking facilities.

It has made reference to the master plan provision that accords priority to the pedestrian safety. It has proposed special integrated schemes for improvement for these areas. This includes pedestrianisation of inner circle in Connaught Place and pedestrianisation (partial) Chowk Area with heritage considerations

Delhi CDP has provided for Rs 150 crore investments for strengthening and improving footpaths along major arterial roads.

AHMEDABAD

This has highlighted the problem of accident risk. Identifies stretches along the Narol-Naroda Highway, Ashram Road, Relief Road that have high pedestrian traffic. It also points out the problem of lack proper pedestrian facilities such as footpaths and zebra crossings. Also footpaths along major commercial roads are either of very less width or are encroached upon

The roads in Ahmedabad have carriageway of around 14 meter that do not have well developed pedestrian facilities and also face problems of encroachment by informal shops and on-street parking, reducing the effective carriageway. The city has quite a number of five arm and six arm junctions, most of which are rotary intersections. Due to the limitation of its capacities, these rotaries are gradually becoming incapable of handling the increasing traffic. The roads have partially developed right-of-ways and lack pedestrian facilities

The BRT project in Ahmedabad has exclusive space for buses, bicycles and pedestrians.

It proposes appropriate pedestrian facilities to be developed on the major roads having significant pedestrian cross traffic.

It also proposes to develop Bhadra Area & other City Heritage Conservation, and this will be made Vehicle Free Zone.

FARIDABAD

Appropriate safety and visibility enhancement parameters like signage, markings, channel islands, street name boards and other street furniture are absent on the majority of roads. Major roads lack footpaths and pedestrian facilities; those available are encroached upon by informal activities and street hawkers.

The CDP mentions that the authorities will provide for bicycle networks and pedestrian facilities including footpaths and would ensure that that at least 60 percent of the roads have footpaths (i.e. roads measuring 20 feet and more). Design of new roads shall necessarily have provision for shoulders, foot paths, utility ducts and storm water drains under the foot paths, landscaped median and concealed cabling for lighting system

Also has plan for BRTS, so sidewalks will be improved as apart of this infrastructure.

NANDED

The streets developed on pedestrian scale with narrow widths sufficient to allow movement of palanquins, hand carts and other slow moving means of transport.

The Development plan has laid out a clear hierarchy of roads with appropriate widths. Most of the roads are in a bad condition in terms of geometry, signage and other

functional elements such as pedestrian pathways, lighting, arboriculture, road markings, etc.. It has proposed pedestrian plans.

HYDERABAD

The CDP informs that about 40 percent of the accidents occurring in the city involve pedestrians as victims. This is attributed to poor pedestrian facilities. Most fatal accidents involving pedestrians occur while crossing roads. This is largely because approach speeds are high more than 60 kmph; awaiting time for pedestrian or vehicles is too long; peak hour volume for pedestrian and vehicles are very high for the divided carriageways. The CDP states that as a significant proportion of the trips of up to 2 km in length are performed on foot and since pedestrians are more vulnerable to accidents, it is necessary to protect them through provision of Guard Rails, Zebra Crossings, and Pelican signals or through Grade separations.

The CDP has thus proposed an investment of Rs 36 crore for improvement in pedestrian facilities, comfort and safety. This includes subways, foot over bridge and Rs 220 crore on signage for pedestrian crossing.

BANGALORE

Safety concerns of cyclists and pedestrians have been raised. It has proposed construction of segregated rights of way for bicycles and pedestrians. CDP has proposed restoration of footpaths and improvement of old/worn out footpaths and relocation of utilities to provide right of way to pedestrians particularly with the help of pelican signals.

This will be done on a stretch of 100 km. Barricading of footpaths with openings only at strategic locations to regulate pedestrian movement, to improve traffic safety on 10,000 metre stretch. Raised Crosswalks/Pelican Signals-the pavements are planned with smooth gradient so that the vehicles have to slow down when they encounter them and allow the pedestrians to cross the road safely. This will be done in 50 locations. Pedestrian walkovers to be provided at high pedestrian activity links and zones at 10 locations. The proposal also includes construction and rehabilitation of footpaths and medians; Construction of subways, skywalks; Development of pedestrian/ cycling zones; Rehabilitation and installation of street lights.

WILL NANDED BE OUR LITTLE "COPENHAGEN"?

Nanded, a small town in the Marathwada region of Maharashtra is all geared up to become the 'Copenhagen' of India. This network and walkway improvement project was conceived under JNNURM in 2006. The Municipality of Nanded and a private firm have taken up renovation of 48 km of roads under the Centre's Jawaharlal Urban Renewable Mission. A group of architects have selected what is termed as a more "inclusive" and "universal" road design with space for all road users, which would also facilitate even the visually impaired. The right of way has been designed keeping in mind road safety, segregation of traffic, improvement of traffic flows, allocation of space for off road activities and siting of street furniture, modal integration, beautification and landscaping or in other words green streets and maintaining quality of public space.

The pedestrian way has been planned in a way that space is allotted to pedestrians, cyclists, the multiutility zone that include parking space for cars, two wheelers, bicycles and autorickshaws, bus stops, hawker platforms so that they do not encroach upon the footpaths or the roads. Space has been created for trees, public toilets, post boxes, street lights, planters, garbage bins, garbage collection points, electric transformers and advertising space. The existing land use has been taken into consideration while designing the streets.

The design has also provided for pedestrian crossings, pedestrian refuge islands, signages, traffic signals. The design though provides for kerb cuts for access to the abutting land use, the sidewalk has been continued across the bituminous patch and cobbled ramps have been provided on either side for returning the automobiles back to the road. This also deters the motorized vehicles from picking up speed and acts as a traffic calming measure. Intersections have also been designed and cobbled. Even the entry and exit of the adjacent buildings have been changed to make it a bit more pedestrian friendly, a taste of new urbanism.

The city has found itself a berth in the category 'C' of the JNNURM floated by the Ministry of Urban Development by virtue of its religious and pilgrimage importance — one of the five Takhts of the Sikh religion. The core area is plagued with dearth of facilities for pedestrians and lack of signages.

The cycle rickshaws, are still important transportation mode. Before the jeeps and cars take over its roads its important for this town to plan an alternative path. Managed by the ILFS group, and designed and conceptualized by Pradeep Sachdeva, Interface for Cycling Expertise, (I-CE) the Netherlands, TRIPP and L.R. Kadiyali and Associates Nanded is all set for a "new look". Sachdeva says, "The streets have traditionally been extension of our homes in India and a well designed street should provide recreational spaces to the rich and the poor, hence a lot of nitty-gritty should be looked into for designing the streets."

6.2. Pedestrian rights in cities

Traffic and motor vehicle regulations that have bearing on pedestrians: The laws and regulations directed at the motorists are expected to accord passive protection to pedestrians. All state governments are guided by the procedures laid down in the central Motor Vehicles Act 1988 and Rules 1989 and the state Motor Vehicle rules administered by the Union ministry of transport, shipping road transport and highways. The sections of the Motor vehicles act (279, 304A, 336, 337, 338, IPC) are designed to prevent negligent and rash driving that can inflict harm on human life and public property.

Rules are explicit on the responsibilities of the motorists: The rules under this act widely cover various aspects of driving of motor vehicles, — keeping left, overtaking, caution at road junction, right of way to pedestrians, signals to be given by drivers, parking, visibility of lamps and registration marks, lane driving, respecting stop sign on road surface, distance from vehicles in front, no abrupt brake except for safety reasons, no projection of loads, restriction on driving backwards, carrying of documents, viz., driving license, permit and fitness certificate etc. These if enforced are expected to accord safety to the pedestrians.

Motorists cannot enter the pedestrian way: The Rules of the Road Regulation 1989 mention that, "Pedestrians have the right of way at uncontrolled pedestrian crossings. When any road is provided with a footpath or cycle track especially for other traffic, except with permission of a police officer in uniform, a driver shall not drive on such footpath or track." But this is rarely enforced in cities. Only in the pilot corridor of bus rapid transit system that has a dedicated pedestrian way, traffic police has started imposing a fine of Rs 100 if a motorist enters the pedestrian way. But this has not been enforced rigorously. Footpaths are also used for parking.

Rules say motorists cannot enter the pedestrian ways. But this is hardly ever enforced. Only in the pilot BRT corridor traffic police has very recently started to impose fine.

Motorists liable to punishable offence but not a deterrent: Contrary to the popular notion that there are no legal restrictions barring on motorists from encroaching into the pedestrian space, such rules do exist under the Central Motor Vehicles Act. Such offences are liable to punishment and are expected to be deterrents (See box *Obligations of the motorists under the Central Motor Vehicle Act and Rule*). But no one is paying attention to these rules to enforce them. The Delhi Control of Vehicular and Other Traffic on Roads and Street Regulations 1980 (Delhi Road Regulations 1980) also enlist a series of precautionary measures that have to be followed by the motorist to maximize protection (see box: *Delhi Road Regulations 1980 demand precaution from motorist*).

Draft National Road Safety policy focused on vehicles: The provisions of the Central Motor Vehicles Act are however not adequate to ensure full protection of pedestrians. Following the spate of road accidents, injuries and fatalities caused to the pedestrians and cyclists, the Ministry of Shipping, Highways and Road Transport has drafted the National Road Safety policy. Under this policy the government will provide financial assistance to the states and local bodies for

improving the quality of investigation of crash incidents for data collection, transmission and analysis. The policy also intends to ensure incorporation of safety design aspects in vehicles during manufacture, usage and operation of vehicles and also include aspects of maintenance and operation of motorized and non motorized vehicles that would be comparable with international standards. The policy suggests traffic education and public awareness about the social and economic implications of road accidents. It proposes database on road safety information. This draft policy is still vehicle centric.

6.3. Rules targeted at pedestrians

At the city level a wide range of laws and bye laws converge to provide the basis for addressing the pedestrian related issues. But most of these rules remain in oblivion as there is little active policy interest in using them.

Laws to prevent obstruction of public spaces but not enforced: Rules exist to keep the pedestrian ways free from obstructions. But these rules remain on paper and are rarely enforced. The Section 283 of the Indian Penal Code (IPC) views causing of obstruction in public space as a punishable offence. It states that "Danger or obstruction in public way or the line of navigation) ... shall be punished with fine which may extend to two hundred rupees. The offence punishable under this section is the nuisance of causing obstruction". Also section 34 of the Police Act does not allow obstruction in public spaces. Accordingly, "No person shall cause obstruction in any street or public place by – allowing animals or vehicle; using any part of a street or public place as a halting place for vehicles or cattle; leaving any box, bale package or other things whatsoever or upon a street for an unreasonable length of time; by exposing anything for sale or setting out anything for sale in or upon any stall, booth, board, cask, and basket or in any other way whatsoever." Section 283 of the IPC and the Police act views vending as a non conforming act in a public space as it creates obstruction.

Clearly, none of these provisions are enforced to enable free flow of pedestrians without any obstruction. This amounts to violation of pedestrian rights.

Rules exist for street vendors: The government of India has designed a policy for vending on urban streets supporting and protecting the livelihood rights of these poor people. According to a study Mumbai has largest number of street vendors around 2,50,000 followed by Delhi 2,00,000 and Kolkata 1,50,000. Though vending may create obstruction on the through route of the pedestrians it is an important street function as these provide the basic public amenities like drinking water, street food etc. This informal sector supplies a range of services and also their presence on the roads make people feel secured especially at bus stops.

Policy requires registration of vendors for accessing public spaces based upon planning norms and standards. But enforcement is weak.

The vendors and hawkers on the streets are protected by the Urban Street Vendor Policy, Delhi and the National Capital Territory of Delhi Laws (Special Provisions) Act, 2007 vide which all hawkers are protected from evacuation from the streets till December 2008. But this has not led to any concise policy to create proper zone for hawkers that does not impede pedestrian access.

The policy was formed following a Supreme Court diktat and it outlines the planning norms for demarcating vending zones and clusters where and when needed. The policy outlines quantitative and qualitative guidelines for vending zones. The quantitative guidelines include the area to be allocated for vending and the qualitative guidelines specify the kind of facilities that have to be present in the vending zones. These zones need to be provided with solid waste disposal facilities,

OBLIGATIONS OF THE MOTORISTS UNDER THE CENTRAL MOTOR VEHICLE ACT AND RULE

For rash and negligent driving on a public way (Section 279):, ..., shall be punished with imprisonment of either description for a term which may extend to six months, or with fine which may extend to one thousand rupees, or with both."

For causing death by negligence (Section 304A): .....be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both."

Endangering life or personal safety of others (Section 336 Act) "....shall be punished with imprisonment of either description for a term which may extend to three months, or with fine which may extend to two hundred and fifty rupees, or with both."

For causing hurt by act endangering life or personal safety of others (Section 337): ... shall be punished with imprisonment of other description for a term which may extend to six months, or with fine which may extend to five hundred rupees, or with both."

For causing grievous hurt by Endangering life or personal safety of others (Section 338): "....., shall be punished with imprisonment of either description for a term which may extend to two years, or with fine which may extend to one thousand rupees, or with both."

License of drivers (Section 19) .... disqualify any person from holding a driving licence or revoke such licence, if driving is likely to be attended with danger to the public; etc

Speed limit (section 112) pertains to limits of speed and prohibits driving of a motor vehicle or it being allowed to be driven in any public place at a speed exceeding the maximum permissible speed. Rule 118 requires notified transport vehicles to be fitted with a speed governor Section 113 provides for limits of weight and limitations on use.

Parking on footpaths prohibited: The same rules also state that the footway, footpath or the sidewalk are to be used by the pedestrians and actually prohibits drivers from parking on the footpaths. It mentions "a driver should not park his vehicle "on a footpath; near a traffic light or pedestrian crossing, away from the edge of the footpath.

Motorist not allowed to violate the stop sign on road surface: The rules say "When any line is painted on or inlaid into the surface of any road at the approach to the road junction or to a pedestrian crossing or otherwise, no driver shall drive a motor vehicle shall any part thereof projects beyond that line at any time when a signal to stop is being given by the Police Officer or by means of traffic control light or by display of any traffic sign. Secondly, a line for the purpose of this regulation shall not be less than 50 millimeters in width at any part and may be either in white, black or yellow."

DELHI ROAD REGULATIONS 1980 DEMAND PRECAUTION FROM MOTORIST

The motorists have to adhere to following clauses for protecting the rights of the pedestrians

The driver of every vehicle approaching a pedestrian crossing shall unless he can see that there is no pedestrian crossing the road or about to cross the road, proceed at such a speed as to able, if necessary, to stop the vehicle before reaching it.

The driver of every vehicle approaching a crossing where traffic is not for the time being controlled by a traffic constable or by any signaling device shall allow free and uniway at crossing and every pedestrian shall have precedence at such crossing and every pedestrian shall have precedence over all vehicular traffic at such crossing.

The driver of every vehicle at or approaching a crossing at a road intersection where traffic is controlled by a constable or by a signaling device shall allow free and interrupted passage to every pedestrian who has started to go over the crossing before the driver receives a signal that he may proceed over the crossing.

In case pedestrians are crossing a road at an intersection where pedestrian crossing exists, or in the vicinity thereof, no vehicle shall obstruct the passage of pedestrians.

In passing over a mire or puddle, the driver of a motor vehicle should slow down so as not to splash others with mud, foul water, etc

When a sightless person or a child or an infant is walking on a road accompanied by no guardian, a driver of the motor vehicle shall stop his vehicle or slow down so that their passing or walking may not be obstructed.

street lighting, aesthetically designed mobile shops, push carts, cleanliness and public toilets by the civic authorities. Traditionally vendors are licensed but the policy suggests the registration of vendors for accessing public spaces based upon planning norms and standards. The policy also includes other aspects like monitoring of hawking activity, rehabilitation and relocation etc. Clearly, enforcement remains weak.

Penalty for jaywalking: There is not enough information on how jaywalking is dealt with legally in different cities of India. The common impression is that there is no legal provision against jaywalking. In Delhi however, a nascent rule exists to prevent the pedestrians from jaywalking. The ruling to fine jaywalkers has been implemented under Section 28 of the Delhi Police Act, which enables the police to formulate new rules for better governance of traffic.

6.4. Pedestrian in urban planning: Master Plans

Increasingly the question is being raised how pedestrians and their needs can be integrated in urban and land-use planning. The most powerful instrument is the city Master Plan that provides the template for urban planning.

The Master Plan 2021 of Delhi seeks to make the city more pedestrian friendly. It proposes that the major work centres where pedestrian networks emerge and culminate, should have enhanced pedestrians facilities. This will need more sensitive and intricate design of street, street furniture, for daily urban experience. It acknowledges that pedestrian networks affect spaces in a very distinctive way. Pedestrian networks reveal the vitality of an area. They provide richness in terms of spatial experience and community interaction etc.

In view of the upcoming Commonwealth Games the Delhi Master Plan also states that Delhi needs to be upgraded to international standards in matters of urban transport and therefore several areas need to be decongested with increased access to public transit facilities. Ensure safety for all section of the road users including pedestrians. Promote pedestrianisation and properly planned use of non-motorised transport systems.

DO'S AND DON'TS FOR PEDESTRIANS

Delhi Traffic Police has issued the following guidelines for Pedestrians

- **Where possible, avoid walking next to the kerb with back to the traffic.**
- **Wear or carry something light coloured, bright or fluorescent in poor daylight conditions. In dark use reflective materials (e.g. armbands, sashes, waistcoats and jackets) which can be seen.**
- **When taking children out, walk between them and the traffic and hold their hands firmly. Strap very young children into push-chairs or use reins.**
- **Always walk on the footpath. Where there is no footpath, walk in the right side margin of the road to be able to see the traffic coming in the opposite direction.**
- **Cross roads where there are pedestrian crossings. They have been painted at great cost.**
- **Where there are no pedestrian crossings, watch the traffic on both sides and cross.**
- **MUST NOT walk on motorways or slip roads except in an emergency**
- **Never walk on the main carriageway, it could be fatal**
- **Do not read newspapers or look at hoardings while walking on the road.**
- **Do not come on to the main road while waiting for a bus. Stay on the footpath at earmarked bus stoppage.**
- **Where there are barriers, cross the road only at the gaps provided for pedestrians. Do not climb over the barriers or walk between them and the road.**
- **Always cross between the studs or over the zebra markings. Do not cross at the side of the crossing or on the zig-zag lines, as it can be dangerous. MUST NOT loiter on zebra, pelican or puffin crossings.**

The road network in Delhi is based on radial pattern and follows a hierarchy. It proposes that through-traffic in local streets in neighbourhoods should be discouraged. These roads should be made pedestrian and bicycle friendly by using modern traffic calming designs to keep the speeds within limits as per design. A special cell is recommended under the transport department for developing standards and guidelines for traffic calming designs and for their implementation in the whole city in a phased manner.

The master Plan 2021 of Delhi seeks to make the city more pedestrian friendly.

The Master Plan proposes pedestrianisation of historically important places. Provision of Metro Services, is expected to make areas like Connaught Place, Chandni Chowk and Karol Bagh pedestrian friendly. In order to reduce road congestion and the level of pollution, it has also looked into the possibility of having underground roads or Tube roads in critical areas. But these measures will have to be evaluated carefully from the perspective of access and people friendliness.

The Master Plan however, does not discourage grade separated junctions and indicates the need of intersections with grade separators. It proposes elevated road structures to provide uninterrupted flow to traffic through provision of grade separators, cloverleaves and Left Slip roads at intersections of all roads of 30 m. and above ROW. However, it has put a rider that grade separated junctions shall be considered if there is no other possibility of improving traffic flow. Further it should also be ensured that pedestrians and bicyclists continue to have safe and convenient access to the junction.

Major corridors with mixed land use with or without authorisation should be identified and taken up for redevelopment to develop open areas for parking, green development and pedestrianisation.

It further proposes that streets of less than 6m ROW notified as mixed-use streets or as commercial streets, in regularized and unauthorised colonies, resettlement colonies, special area, urban villages, will be declared as pedestrian shopping streets and will not be open to motorized transport. Also those declared as commercial street areas with ROW less than 6m shall be pedestrian shopping street and not open to motorized transport. Optimal use and utilisation of the existing road network and full development of right of way by removing all impediments has been emphasised. All arterial roads will be restructured to allow for smooth and safe flow of buses and non-motorised transport to minimize pollution and congestion.

6.5. Design and engineering guidelines inadequate

A great part of the solution to the pedestrian woes lies in the way walkways are designed. In Delhi for instance, the roads are constructed and maintained by the Municipal Corporation of Delhi (MCD), Public Works Department (PWD) and the New Delhi Municipal Council (NDMC) within their respective jurisdictions. The footpaths are a part of the roadways constructed and maintained by these agencies.

Explicit design guidelines for roads and pedestrian pathways have been coded in the Guidelines of Urban Development Plans Formulation and Implementation (UDPFI) that the development agencies follow. These also incorporate the Indian Road Congress Guidelines. UDPFI and the Road transport Institute rules (RTIs) have specified the dimension and the way the pedestrian walkways should be built.

But there is no provision to ensure that these are properly implemented or that the municipal and development agencies can be held accountable for the quality and

comfort of the sidewalks, and crossings. In many cases the way the sidewalks are designed are not pedestrian friendly.

A major cause for present day chaos on the roads is that the road infrastructure, signage and road markings are not in accordance to the standards laid down by the Motor Vehicle Rules and Highway Code. Concerned road owning agencies are responsible under the law for installing the appropriate road signage and markings on regular basis. They are responsible for pedestrian facilities and removal of encroachments from footpaths.

There are special provisions even for disable that state that the streets should be complete streets with universal design equally accessible to both the able and the disabled. The government of India has enacted the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 to create barrier free environment for persons with disabilities and to make special provisions for the integration of persons with disabilities into the social mainstream.

6.6. Climate mitigation create opportunities

It is expected that the on-going initiative to develop an urban habitat programme to reduce the carbon and energy footprint of cities under the National Climate Action Plan of the Government of India will create more policy opportunities for protection of pedestrians and their rights. The mission document of the Union ministry of urban development has taken note of this strategy. This can effectively help to mobilize resources at the city and national level.

The Government of India is already eying the international carbon funding systems to cater to the needs of non-motorised transport including pedestrians. In February

DELHI MASTER PLAN AND PEDESTRIANS

SHAHJAHANABAD, THE OLD CITY: The historical city of Shahjahanabad needs to be conserved with its traditional cultural haritage and structures. Under the redevelopment programme, the street pattern in residential area is proposed to be restructured with linkages from the metro stations. Common facilities shall be located with linkages to pedestrian roads and metro stations. Many areas in Shahjahanabad to be pedestrianised and made completely free of vehicular traffic so as to restore the human scale and convenient living.

KAROL BAGH: Karol Bagh area is due for comprehensive redevelopment on the basis of mixed-use concept. The grid iron pattern should be treated as an asset to regulate and pedestrianize the traffic movement. The standards of housing density, minimum width of roads and community facilities can be relaxed, wherever justified, by planning considerations (e.g., pedestrianization of the area). The circulation pattern should include segregation of pedestrian and vehicular traffic, entry control, provision of adequate parking etc.

CONNAUGHT PLACE: An integrated plan incorporating urban design, landscape, traffic and transportation schemes, safe pedestrian walkways, parking areas, recreational and cultural areas etc. is to be prepared for its development. There should be continuity of the sidewalks should be maintained in terms of the width, surface treatment, curb cuts, tree and street furniture locations, for the pedestrians and disabled. Detailed Urban Design and Landscape Schemes should be prepared to integrate MRTS stations, safe pedestrian walkways, parking areas, recreational and cultural areas, etc. Surface parking should be located in a manner that does not diminish or hinder the continuity and homogeneity of the spatial and pedestrian movement. Street furniture and signage should be designed sensitively considering the land use, intensity of activity and other identified design districts. Their design must also reflect respect to pedestrians and physically challenged people.

2009 the Government of India has applied to the Global Environmental Facility (GEF), within its Sustainable Urban Transport Project (SUTP) in India. The objective is to address energy security and greenhouse gas emissions. There are also discussions regarding the possibility of tapping Clean Development Mechanism.

The GEF proposal has been crafted for application of the National Urban Transport Policy. The proposal includes demonstration projects in selected cities and that includes among others projects on non-motorized transport and pedestrian facilities. Thus, pedestrian infrastructure has been proposed as part of the GEF scheme. Hyderabad, Pune, Ajmer-Pushkar, Jalandhar, Thiruvananthapuram have been listed for pedestrian infrastructure improvement. The demonstration projects include reconstruction of footpaths, provision of subways and foot over bridges, pedetrianization measures through traffic signals, construction of new footpaths, paving and delineation of areas as pedestrian friendly precincts, peripheral vehicular parking, construction of cycle lanes, street furniture, lighting & bollards (See box: *Projects on walking to mitigate climate in Indian cities*)

EXCERPTS FROM GUIDELINES

UDPFI: The Ministry of Urban Development & Poverty Alleviation in 1996, in collaboration with Institute of Town planners India prepared the `Urban Development Plans Formulation and Implementation (UDPFI) Guidelines', with a view to making urban planning and development process more effective, dynamic and participatory and also to reflect on the spirit of 74th Constitution Amendment Act, 1992; which among others, aims at developing urban planning, including town planning function to elected local bodies. Some of the key highlights related to walkways are as follow:

Footpath (sidewalk) – The minimum width of footpath should be 1.5 meters. The width should be increased by 1 meter in business/shopping areas to allow for dead width.

Footpaths adjacent to shopping frontage should be at least 3.5 meters and a minimum of 4.5 meters frontage is desirable adjoining longer shopping frontages.

In the arterial (50 – 60 meters), sub arterial (30 –40 meters), collector streets (20 –30 meters) urban residential/local streets (10 – 20 meters), the recommended width of footpath in a cross section is 3 meters and in case of urban cul–de-sac, it is 1.5 meters.

CPWD: Walkway should be constructed with a non-slip material & different from rest of the area.

The walkway should not cross vehicular traffic.

The manhole, tree or any other obstructions in the walkway should be avoided. Guiding block at the starting of walkway & finishing of the walkway should be provided.

Guiding block ran be of red chequered title, smooth rubble finish, prima regina, Naveen tiles or any other material with a different texture as compared to the rest of the area.

XITH FIVE YEAR PLAN ON URBAN TRANSPORT (Planning Commission): Where pedestrian traffic is of high intensity grade separated facilities like FOBs, subways and under bridges need to be created. It is also mentioned that while designing underpasses the depth of pedestrian subways need to be reduced by raising the road level half way.

Sidewalks/footpaths need to be physically segregated from the carriageway to avoid conflicts and their width should not be less than 2 meters. They should not be looked upon as provision for future road (carriageway) expansion.

Informal sector operating on footpaths should be planned and integrated with design of pedestrian facility.

Crowded areas especially market places where intensity of pedestrian traffic is high they should be declared as complete pedestrian zones with a limited number of eco – friendly. vehicles. However, in such areas there should be proper parking facilities and they should be integrated with pedestrian facilities.

Road side furniture such as appropriate road markings, lane changing zones, proper lighting, traffic signals and signages and landscaping and aesthetics, ITS components, guide maps etc. as provided by IRC norms.

GEOMETRY OF FOOTPATHS

Cities develop their respective design standards for pedestrian facilities based on international best practice and national guidance. These need urgent reforms.

In India the road development agencies follow the guidelines of the Indian Road Congress that has detailed out the regulations and control of mixed traffic in urban areas and geometric design standards for urban roads.

These guidelines have prescribed the minimum width of 1.5 meters that can go upto 4 meters depending on the pedestrian volume per hour, and also according to land-use. There is no standard international practice. The cities largely follow the guidelines laid down by the Indian Road Congress (IRC). For example, the IRC guidelines specify the width of zebra crossing that can be between 2 to 4 meters and that these should not be within 150 meters from each other. There is no clear international benchmark on this but it can be compared with the proviso in other countries. The Japanese government for instance is revising their norms and is expected to specify 3.5 m for high volume area and 2 m for other areas. Otherwise currently, the minimum width is 2 m. It accounts for the fact that one pedestrian needs 0.75 m to walk and a wheelchair needs 0.9m. If a bench is placed on the sidewalk another 1.0 m should be added and 1.5 m for planting roadside trees.

Groups like Praja that are fighting for reforms of engineering parameters of footpath in Chennai and Bangalore point out that IRC guidelines are not explicit on the right of way for pedestrians at non-signal controlled zebra crossing. There are no clear requirements regarding the height of the footpaths. Guidelines are also weak on dipped kerbs and gradients, pedestrian refuge and types. There are also no guidelines on the timing of the signals from the pedestrian perspective. These are also silent regarding width around street furniture.

In Indian IRC the provision of mid block crossing of the distance between two consecutive intersections should be more than 300 meters. It also specifies the needs for adequate median strip and pedestrian refuge, and for controlled crossings and grade separated crossing. According to the guidelines controlled crossing is required when peak pedestrian volume per hour and vehicles are such that these equal to ten to the power of eight, approach speeds 65 km/h, wait times for pedestrians are too long and accidents indicate 5 or more pedestrian injuries a year.

Table 5: The guidelines for footpaths

Capacity in (Persons) (in one hour)		Required width of footpath in meters
All in one direction	In both directions	
1220	800	1.5
2400	1600	2.0
3600	2400	2.5
4800	3200	3.0
6000	4000	4.0

Source: Urban Development Plans Formulation & Implementation Guidelines (UDPFI).

THE GUIDELINES FOR THE ELDERLY AND THE DISABLED FOR A BARRIER FREE ENVIRONMENT

All citizens should have equal access to the transportation system. Based upon this fundamental principle that the streets should be complete streets with universal design equally accessible to both the able and the disabled the government of India had enacted the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 to create barrier free environment for persons with disabilities and to make special provisions for the integration of persons with disabilities into the social mainstream. Chapter VII of the Act, Sections 44 to 46 deal with non-discrimination in transport on the roads and in the built environment. It enjoins upon the governments and local authorities to ensure within their economic capacity provision for installation of auditory signals at red lights in the public roads for the benefit of persons with visual handicaps, kerbs and slopes to be made in pavements for the easy access of wheel chair users, devising appropriate symbols of disability an warning signals at appropriate places.

The guideline mentions the necessities for easy access of the disabled to transport — Safe crossing facilities for persons with wheel chair and with impaired vision by providing; acoustic signal and installing a safety zone on a wide road; Provision of kerb ramp at appropriate location at the footpath; Provision of guiding block at the starting and ending of crossing; Accessible bus stop/taxi stand (refer transportation, details or bus stop/taxi stand); Accessible sub way/over bridge (refer transportation, details of over bridge); Accessible concourse, ticket booth of the railway station (refer transportation).

At bus stops the designing should include — Two rows of guiding blocks for persons with impaired vision should be provided 300 mm, away from the bus stop pole on the sidewalk; the bus stop pole should be clearly visible after dark; the bus stop area should be equipped with a roof and bench; information on the names of all stops along a bus route should be indicated inside the bus by displaying text in a suitable position. Preferably, this information should also be announced verbally; information on a route and its final destination should be displayed outside the bus in large text, especially on its front and side. This information should be illuminated by an internal light to make it readable in the dark; guiding blocks for persons with impaired vision. The kerb ramp should be present with guiding lines.

6.7. What is amiss?

No rules to prevent erosion of walking space: Even with the plethora of laws and regulations pedestrian space is under such stress. None of these rules are effective enough to prevent shrinking of space dedicated for walking. In many localities footpaths are being narrowed to create more space for the motorised traffic. Local residents find it hard to prevent this trend. Laws do not come to their rescue. The town planners could have leveraged the existing laws to protect and improve pedestrian ways and even enable pedestrianisation as a step towards reducing motorized trips. But the existing legal provisions remain ineffective.

The fundamental weakness that persists in the legal framework for pedestrians is that there is technically no rule that prevents taking away of the pedestrian space to meet the insatiable need of the motorized traffic. Walking space can be easily sacrifised without any question.

Even based on the existing laws a lot is possible to protect and improve pedestrian ways and even enable pedestrianisation of key centres as a step towards reducing motorized trips. But the current legal provisions remain nearly invisible and are rarely enforced for effective impact.

People are not included in decisions that affect pedestrian space: When large projects on road infrastructure, road widening and road elevation are initiated

PROJECTS ON WALKING TO MITIGATE CLIMATE IN INDIAN CITIES

Pedestrian projects have been proposed for funding to under the Global Environmental Facility (GEF) to implement GEF's Sustainable Urban Transport Project (SUTP) in India

AJMER

The proposals for Ajmer include - Pushkar construction of Sub-way at Gandhi Bhawan Circle for safe pedestrian movement, Provision of Railway Over Bridge at John's Gunj, Introduction of pedestrian priority traffic signal at important junctions, improving geometric designs of the junctions by providing exclusive pedestrian phase to facilitate safe crossing for the pedestrians. The provision of pelican lights at schools, colleges & important institution areas, road marking and associated street furniture like street lighting, railing, zebra crossing and stop line marking etc.. Environmental enhancement of Pushkar area through provision of pedestrian infrastructure, paving of main spine-Parikrama Marg (with cobbled stone interlocking tiles) for giving it a distinct image. Project outlay is estimated at INR 33.4 Crores.

HYDERABAD

The proposals for this city include improvement in the pedestrian facilities for enabling better accessibility to the Multi Modal Transport System (MMTS). Pedestrian access in the precincts of MMTS stations are intended to be improved. This involves rendering the pedestrian facilities free from encroachments. Design and construct facilities with sufficient detail to function efficiently for transfer of passengers to MMTS. The Components proposed under the project are: (i) Provisions of proper pedestrian safety measures include provision of encroachment free continuous footpaths, zebra crossings, installing pedestrian signals and construction of foot over-bridges (FOB) (ii) Provision of proper and wide access roads (iii) Provision of ample parking areas near the stations to encourage park and ride concept for people with bicycles & two wheelers to encourage the system. The proposed pedestrian friendly improvements have been proposed at 15 identified MMTS stations, wherein improvements have been suggested within area of 2.5 km radius of the proposed locations. Project outlay for the proposed components is estimated at INR 59.3 Crores.

JALANDHAR

Cycle and cycle rickshaw trips in the city are higher than bus and mni bus trips. This highlights the significance of non-motorized component in the city. When compared in terms of the daily person trips, cycle and cycle Rickshaw outperforms even the mini bus -- 41,000 against the 16,000 daily person trips, thus showing the large possibility of improving and patronizing pedestrian and cycling facility in the city.

The projects proposed in GEF-SUTP are aimed at improving pedestrian and cycling facilities along main corridors in the city. The proposed sub-components under the project are as include -- Construction of footpath of varying width, depending on availability of the right of way along various roads in the city. Development of supporting pedestrians' facilities such as pedestrian signal lights, road marking & signages, street furniture and associated landscape enhancement at important locations. Construction of cycle track of varying width, depending on availability of the right of way along various roads in the city. Development of ancillary facilities like road signages marking and landscape improvement for the proposed cycle network. Construction of rickshaw tracks along various roads. Development of ancillary facilities like signage, marking, shelters, public conveniences etc. for rickshaw tracks.

PUNE

The proposal for Pune includes pedestrian infrastructure improvements; reconditioning footpaths by adding to their widths where necessary; and limiting their height where it exceeds the standards.

It further includes improvements of sections of existing footpath depressed for facilitating driveway access; construction of raised crosswalks; areas without pedestrian facilities will be reconstructed. The plan will also look at foort overbridges and sub-ways, street furniture, lighting and road marking.

THIRUVANTHAPURAM

Proposed project interventions in the city are aimed at decongestion of the existing congested areas near railway station and Chalai area to bring about reductions in GHG emissions and improve environmental quality in the area. The proposed project components in GEF-SUTP include (i) pedestrianisation of Chalai Main Street and ancillary alleys and (ii) construction of elevated walkway connecting Chalai market, Central Railway Station and Central Bus Stand. Proposed sub-components in the project are as below. Pedestrianization of Chalai Main Street and Ancillary Alleys. Conversion of ~ h a l a i Main Street and selected alleys into a vehicle free zone. Redevelopment plan of Chalai area, at the crossing of Power House Road with the proposed elevated walkway. Total project outlay for the project interventions is estimated at INR 42.49 Crores

there is no provision of public hearing in the municipal laws to consult the local residents in cities. Pedestrians do not count in the decision making. Such erosion of pedestrian space does not lead to any penalty on the city developers and planners. This cannot be prevented under the current legal framework. The rules do not demand accountability on part of the municipal and development agencies.

Do cities need new laws to protect all road users? The Law commission of India in its consultation paper on "Legal Reforms to Combat Road Accidents" in 2008 proposes that the state governments in consultation with the union government initiate a process for enactment of a traffic management and regulation act that would also include the legal rights and duties of pedestrians and bicycles and also govern their behaviour on roads and that of other motor vehicles. Well planned facilities and infrastructure should be an integral feature of all urban roads.

This concern has been revisited in the context of the segregation of road users for bus rapid transit system. Often city officials point towards the need of separate legislation for road based mass rapid transit that allows for traffic segregation and lays down the duties and protects the rights of all road users. This can lay down guidelines on pedestrian walkways and how pedestrian movement needs to be facilitated. Specify who should have the right of way, and what should be the acceptable crossing time for pedestrians at the traffic signals at intersections. Building footpaths that are connected and continuous with no obstruction on through routes is the first step towards channelising people towards public transit. But there is experience with such specialised legislation globally and perhaps it is time to evaluate the possibility of a comprehensive legislation.

7. WHAT ARE OTHER GOVERNMENTS DOING?

Pedestrians have begun to draw policy attention globally as there is growing desperation to pave the way for neo urbanism. Build cities entirely a new way to improve quality of life and reduce dependence on motorized vehicles. This is the ultimate solution to pollution, congestion and climate debacle. Approaches, however, are varied and divergent.

The broad principles that govern policies on pedestrians in different regions include reduction of conflict between pedestrian and motorized traffic through traffic calming approaches and appropriate road design, application of safety regulations in motorized vehicles, and space protection for pedestrians. Increasingly governments are investing to improve pedestrian facilities that would be convenient, attractive, safe and secured. At the same time, the more progressive cities have focused on implementing several measures that include better facilities for walking, traffic calming in neighborhoods, people oriented urban designs, restrictions on auto use, traffic education and training programmes and above all stricter enforcement of traffic laws and traffic calming measures.

The pedestrian movement in other regions of the world has gone much beyond the upliftment of footpaths for safe and comfortable passage. The strategies are now increasingly focusing on freeing city centres, commercial areas from vehicles, and reducing volume of traffic in residential neighbourhoods. Hierarchy of interventions have been planned to herald in an entirely new ethos of urbanity to reduce automobile dependence.

The key principles are as follow:

The Law Commission of India proposes that the state governments in consultation with the Union government enact traffic management and regulation act that would include legal rights and duties of pedestrian and bicyclists.

Improve engineering, and environmental features of pedestrian ways: The most fundamental is to address the walkways or the footpaths to make walking comfortable and safe and improve the direct access routes to reduce dependence on motorized traffic for shorter trips. This is the first step towards the larger expansion of pedestrian zone to minimize motorized traffic in targeted city centres.

Enforce measures to calm traffic: These include speed restrictions, speed humps, pedestrian refuges to hold people in the median, textured and coloured pavements that the motorists should avoid, traffic circles in the intersections to force motorists not to speed and avoid the pedestrian areas. According to Lloyd Wright the purpose of these is to give both physical and psychological priority to pedestrians. These are largely self enforcing. But this would also require careful evaluation as some of these measures like traffic circle at the intersections may make pedestrian crossing more unsafe as there is continuous flow of traffic. Raised pavements that are made to make pedestrians more visible to the motorists, may be inconvenient to the pedestrians and they may resort to walk at grade on the roads itself.

Some of the well known global experiments include the "Woonerf" experiment in Netherlands that catalysed and spread traffic calming measures like speed bumps, trees, S shaped curves, etc. Following that many neighbourhood projects came up in Germany and other parts of Europe.

Smart growth approaches and home zones: In many US and European cities efforts are being made to counter sprawl through mixed land-use and high density development. To be able to do this they are creating housing opportunities with walkable neighbourhoods. This is enforced with traffic calming measures in the neighbourhoods or home zones as in the United Kingdom (UK). In these approaches car traffic is not eliminated but lightened. There are instances in the UK where parking of cars are being removed from the buildings and being taken farther than the bus stops. Therefore, people have to walk longer to get into their cars than to the bus stops. This discouraged motorized traffic in the neighbourhood and also overall in the city.

The global strategies are now increasingly focusing on freeing city centres and commercial areas from vehicular traffic, and reducing volume of traffic in residential neighbourhoods.

Car free centres and car free housing: The literature shows there are rare instances of car free cities. Only a few notable historical cities that include Venice in Italy, Capri in Italy, Zermatt in Switzerland, and Louvain la Neuve in Belgium are the only instances that are essentially car free within the city boundaries. Points out Wright that Venice, Capri, and Zermatt are also notable for world's highest residential property values and thus indicating that car free location can in fact bolster economic value. Some island cities such as Landau in Hong Kong, Fire Island in the US, Buyukada in Turkey, Capri, could become car free primarily because of the difficulty in developing car infrastructure, densities and journey distances.

Sales increase in pedestrianised shopping areas: However, in other cities targeted areas are kept car free which is also part of the movement to improve urbanity and reduce pollution and congestion. The most common approaches are car free shopping streets. Some global examples are Kaufingerstrafe in Munich, Nanjing Road in Shanghai. These are said to have worlds' highest pedestrian volumes. Kaufingerstrafe as recorded volumes over 15,000 pedestrians per hour, and 200,000 pedestrians per day. Copenhagen has done extensive pedestrianisation. London's Covent Garden is another example. Zurich and Oxford streets are examples of pedestrianisation that allow public transport in the area. This trend is also catching up in developing country cities. Buenos Aires, Curitiba, Sai Paolo, Shanghai have all begun to create car free shopping streets.

There are quite a few car-free housing schemes developing across Europe that give priority to pedestrians and alternative modes of transport. Studies have shown that pedestriansation of shopping areas actually have positive effects on sales.

Studies show that pedestrianisation of shopping areas have positive effects on sales and overall business.

Transport experts in other countries are even estimating how car free development will create more job opportunities. Estimates show that investments in public transit can create more jobs per every USD 1 million of investments as opposed to the same in general automobile manufacture and petroleum – 21.4 for public transit vs 7.5 for automobile. (Table 6: *Summary of economic impact of pedestrianisation on shops*)

Car free days: Number of cities across the world observe car free days. The concept has gathered ground. The car free day concept is not merely not one of limiting traffic in certain streets, but also of enabling city dwellers to discover other means of transport.

It is also possible to track improvement in the urban environment on these days. French air quality monitoring agency have shown in the past how air quality becomes "satisfactory" after only clean fuel and public transport were allowed in the city centres on a car free day. Figures show that in central Paris levels carbon monoxide fell 30 per cent and nitrogen dioxide by 15 percent. Opinion surveys carried out in France and Germany have shown overwhelming support for these events. In October 2000, people of Bogota voted positively for a referendum that

Table 6: Summary of economic impact of pedestrianisation of shops

Place	Impact of pedestrianisation
233 local authorities in Germany	83 percent of firms inside the pedestrianised area reported increase in turnover
	24 per cent of firms outside the pedestrianised area reported increase in turnover
Hameln, Gottingen, and Freiburg in Germany	71 to 85 per cent of retailers with positive view of pedestrianisation in these areas
Retailers in Covent Garden London	60 per cent of survey respondents claimed higher turnovers
Shops on 29 street sections, Leicester, UK	Shop vacancy rates:
	● Car free area: 3.1 per cent
	● Low vehicle flow area: (upto 200 vehicle per hour): 6.4 per cent
	● Medium vehicle flow area: (upto 200-500 vehicle per hour): 10.4 per cent
	● High vehicle free area: (over 500 vehicle per hour): 15.1 per cent
Various pedestrianised street sections in 14 UK towns	Increase in rental prices in prime shopping sites:
	Vehicular streets: 19.7 per cent
	Pedestrianised street: 42.5 per cent
Coventry UK	Increase in sales levels: 40 per cent
	Increase in foot traffic: 25 per cent
West Palm Beach, USA	Increase in property values: Increased by 2.5 to 5 times.

Compiled from Lloyd wright 2005, Car free development, Module 3eGTZ, p 65

asked them whether they wanted all cars off the streets every weekday in morning and evening peak hours from January 2015 onwards.

Setting legal framework for change: The UK has come up with one of the most comprehensive Road Users Act that lays down rules regarding Quiet lanes and Home zones and pedestrian zone. Such legislations deal with all road users — motorised and non–motorised traffic in an integrated manner. The Quiet Lanes and Home Zone Regulations 2006 detail out the provisions. The act indicates the space for each road user and on trespassing severe penalty is imposed. During construction or laying down of utilities alongside roads it is necessary that the pedestrians are notified of the inconvenience and separate diversion route plans prepared and implemented to cause minimal inconvenience to them.

The London Road Traffic Reduction Act 1997 gives guidance to local traffic authorities on the fact that in some urban areas the existing volume of traffic may be such as to prevent further traffic growth during the peak and other periods. In such cases local authorities might adapt their measures of traffic, disaggregated by time of day. Authorities may set local targets that might be expressed in terms of increasing vehicle occupancy or increasing use of other modes of transport. Local authorities may want to reduce traffic levels or their rate of growth in a particular area to make roads safer, improve the local environment, reduce congestion, benefit the local economy or improve air quality.

The Act gives local authorities in London the flexibility to take the needs of all parts of their area into account when deciding the targets. An authority may choose, therefore, to set: -- A single traffic reduction target for their area, relating to all classes of vehicles and to all times of day; a target relating to a particular class of traffic, eg cars or heavy vehicles; a target relating to a particular time of day, eg peak hours; a target relating to a particular part of their area; a target relating to particular types of traffic, eg commuter traffic or journeys to school; a target relating either to existing traffic levels or to their rate of growth; seasonal targets; any combination of the above. London has worked out a range of walking improvement strategies.

Even in the US some states have become more proactive about pedestrian environment. San Francisco for instance has implemented Better Street Policy. This policy focus on walking access to and from the site; assessment of land use to identify how walking trips are generated; capacity and quality of the local network, opportunities and requirements for improvement; inclusion of walking in the transport planning; traffic impact assessment of the development; inclusion of measures in the Travel Plan for the development to maximize walking to and from the site; procedures for funding, monitoring, and enforcement of planning related to walking; policy criteria for adoptable spaces and public rights of way; and, mechanisms for ongoing maintenance of areas accessible to the public.

The average lengthy trip distances in American cities and suburbs have made walking less convenient and attractive.

7.1. Global best practices

It is important to understand the best practice approaches in other key regions of the world including the North America, Europe and Asia.

United States

Poor walking tradition: American cities are historically known for poor walking traditions. In many American cities, walking accounts for a very small percentage of trips. From 1977 to 1995, the inexorably low walking share in urban trips has

declined from 9.3 percent to 5.5 percent. The levels are far below many of the European cities. While the share of walking in the cities of France, Germany, Italy, Switzerland, Sweden, Denmark and Netherlands were close to almost 25 percent in 1995, it was far less in the cities of the US – slightly over 5 percent. The Dutch has almost 3 times higher and Germany has almost 4 times higher walking trips than the American cities. More than 90 percent of the trips in America are motorised.

The average lengthy trip distances in American cities and suburbs have made walking less convenient and attractive. The ease and low cost of owning driving license, lack of pedestrian infrastructure, unsafe environment for walkers and above of all the car dependent American lifestyle are responsible for this. A 2000 National Household Travel survey in the US shows that most Americans walk very little and about 84 percent do not perform any major walk trips. But there could be problems with these estimates as some experts argue that the conventional traffic surveys consider only those trips that are complete by themselves and do not consider the walk trips that form a part of other transportation modes and this makes the share of walking trips miniscule. The actual number of non motorized trips could be much greater.

Surveys also show that age and car ownership also matter. In 1995, the miniscule share of walking trips (of 6-7 percent) in American cities was restricted primarily to the age group of 16 -24 years and 65 years and more cearly indicating that walking as a mode of transport was meant for those who did not drive. The share further depleted to 4 percent for the young age group of 25-39 years and 5 percent for 40 -64 years of age.

The pedestrian infrastructure in the US has become so unsafe that accident related fatalities are more for pedestrians than the motorists. In 1995, in the United States, the fatality rates per billion passenger kilometers traveled for pedestrians were 362 and that for car and light trucks occupants were just 10. The fatalities per 100 million passenger trips were 29 for pedestrians compared to 9 for occupants of cars and light trucks during the same period. The rates of fatalities for pedestrians are very high considering the fact that walking comprised of only 5.5 percent of the modal share. Pedestrian fatality is a severe public health problem that has not received adequate attention.

Transition to pedestrian friendly policies in the US cities: During the late 90s and post 2000 period some of the American city governments have begun to take more progressive views to refurbish land use transport systems and improve facilities for non motorised transport. Virginia, New York, Florida, Washington are some of the cities that have adopted such measures. This makes a lot of sense as studies carried out by experts such as the transport expert John Pucher of Rutgers University show that even in the sprawled American metropolitans nearly half of all trips are shorter than 3 miles and 28 per cent trips are shorter than 1 mile. This brings out the potential of converting many motorized trips to walking trips.

In many of the American cities downtown commercial districts have been declared as pedestrian zones that gives priority to pedestrians. The vehicles are allowed access to shops only for servicing. In some areas traffic free commercial zones are meant only for pedestrians and buses.

Traffic calming measures are introduced while the roads are being designed and constructed. To tame traffic speed they allow tighter corner radii that compel motor drivers to reduce turning speed. Median islands are raised in the centre of the roadway that reduce lane width and provide a place for the pedestrians to stop and

Some American cities have begun to take more positive view of pedestrian traffic. In some cities downtown commercial districts have been declared as pedestrian zones that gives priority to pedestrians.

wait while crossing roads. Curbed extension pinch points also known as chokers are centre-line median islands that narrows traffic lanes and reduce pedestrian crossing distances. Roundabouts, mini circles, speed humps, rumble strips that are low humps that make noise when driven upon, channalisation islands that force traffic in a certain direction only, raised crosswalks and speed tables are other forms of traffic calming measures that facilitate pedestrian movement.

New York*:* The SoHo street scaping is a significant attempt towards reducing traffic volume and introducing pedestrian facilities in commercial areas. A 2006 survey found that most of the shoppers in the area were not drivers and therefore conversion of vehicle parking area to sidewalks would increase the number of shoppers and the amount of business transactions in the area. The majority of shopping dollars were brought by people travelling by mass transit and people travelling on foot and therefore wider sidewalks would invite more shoppers and that would mean more business. The experts remark that wider sidewalks are good not only for safety, health and quality of life but also for business in commercial areas. They have also adopted traffic calming methods like raised crosswalks and speed tables to deter traffic speeds and act as traffic calming measure.

Florida: The city government has adopted traffic claming measures. Several set of roads in Florida were reduced from 4-2 lane and 4-3 lane in the main street roads of Atlantic Boulevard in Del Ray Beach and West Palm Beach county. The road space reallocation made the roads much more attractive and traffic was calmed as speed reduced. Road space allocation can be achieved through number of transport demand management strategies like access management, car free planning, high occupancy vehicle priority, pedestrian infrastructure improvements, sidewalk management, Bus rapid transit systems, speed reduction and traffic calming measures.

European cities have more compact land use pattern that encourage walking. The average density of European cities is triple that of American cities. This has made average trip length about half as long as those in US cities.

Arlington, Virginia: Arlington has adopted the concept of residential neighbourhoods with maximum facilities located within distances that are easily accessible by foot, cycling and mass transit. They have implemented multi modal signal synchronisation in 2006. This has optimised 190 signals to improve pedestrian environment for walking, ensure safety and improve traffic flow thereby reducing fuel consumption and emissions. A thorough review of pedestrian intervals and the newly implemented time for pedestrians allow crossing time to be enhanced by over four seconds per crossing and to further encourage the smooth flow of pedestrians, an exclusive all red phase was introduced into the signal system at selective locations.

Improvements were also made for the cyclists, buses and automobiles near the metro stations where they are specially designed to increase the bus flow and improve the peak directional traffic flow. These improvements were truly multi-modal – for motorists, pedestrians, bicyclists, and transit riders and improved access for all modes of travel.

San Francisco: A Better Street Policy has been introduced to encourage walking and to comply with the California environmental quality laws. The Board of Supervisors of the city and county of San Francisco passed an ordinance in February 2006 for better street policy. This ordinance requires all departments to work in co –ordination with each other regarding the design, planning and use of the public right of way. The unified work of the city government would ensure creation of streets and publicly accessible right of ways that contain the characteristics of good street design and sound environmental planning. The better street policy an official policy document of the city warrants its streets to be designed keeping in mind the

urban design elements of its general plan, the city's transit first policy, best practices in environmental planning and pedestrian oriented multi modal design. The streets should be designed with ample space for public transit, pedestrians and cycling as these are more efficient in moving people and goods than streets designed primarily to move automobiles. The streets should be free from clutter with appropriate designing and siting of signages and street furniture as all these have significant impact on the pedestrian environment.

The Dutch cities had adopted the most developed form of traffic calming -- that imposes even more restrictions on car users with cars required to travel at walking speed near schools, offices, and recreational opportunities.

Europe

More walker-friendly: European cities have more compact land use patterns that encourage walking. The average density of European cities is triple that of American cities. The compact land uses in Europe have made average trip lengths about half as long as those in the cities of United States. Though the European cities might have had a greater share of walking trips than American counterparts, they also witnessed a decline in the walk trips. Though Europe has initiated several measures to preserve a healthy pedestrian environment, the data for the period 1977 to 1995 shows that the share of walking is declining in most cities. In Germany it has dropped from 34 percent to 22 percent and in Netherlands from 18 to 17percent.

The European countries are aiming to revive walking in their cities through stringent regulations and enforcement. They have implemented a range of policies and strategies to make non- motorised modes safer and popular mode of transport. They have improvised facilities for non – motorised infrastructure; adopted traffic calming of residential neighbourhoods,

The Dutch and German policies favour improved green transportation infrastructure that are used by non – motorised users viz. the pedestrians and the bi – cyclists. The auto free pedestrian zones, clearly marked crosswalks, sidewalks on both sides of the streets, pelican and toucan signals, intersection modifications have led to transformation in the physical environment of urban transportation.

In larger German and Dutch cities pedestrian zones occupy often the entire city centre thus encompassing large areas where pedestrians and bicycles have exclusive right of way. They have also included convenient and safe crosswalk facilities in these areas. The zebra crosswalks that are often raised and wide provide continuity and easy accessibility to pedestrians are highly visible and are often illuminated for alerting motorists. There are pedestrian activated signals at intersections and mid blocks thus making all crossings in their cities controlled and safe for pedestrian usage. Roadways with wide carriageways that are difficult to traverse in a single traffic cycle are provided with pedestrian refuge islands. Also, the sidewalks are well lit and wide and have adequate public amenities for pedestrian convenience.

Following the European charter a number of countries focused on improving walkability in their cities. Barcelona, Birmingham, Bristol, Lyon Strasbourg, and Copenhagen, among others made impressive improvements in walking volume and people oriented activities. Barcelona managed to increase walk trips by encouraging mixed land use, low public transit fares and integrated ticketing system, car use discouraged by high rates of parking and other auto restrictive measures. The Barcelona transport system invests additionally 7.5 percent of its financial resources for improvement of non – motorised transport and existing and new bus infrastructure.

CALIFORNIA: MOVING TOWARDS COMPACT COMMUNITIES

California that has aggressively and continuously pushed the frontier of vehicle technology to set new and cleaner benchmark for the rest of the world, has found it so extraordinarily hard to stop its people from racing in cars and choking the streets, undoing the regulatory drive towards zero emissions. California has now enacted a law to steer away from sprawled urban development, and adopt land-use planning aligned with the needs of public transport. This is the first ever law in the US to control global-warming by curbing urban sprawl.

This is a unique experiment to rebuild the community amidst car culture of California. This will encourage local governments and builders to focus on growth in urban areas or close to public transportation hubs in an effort to reduce Californians' use of cars and lower their greenhouse gas emissions. This initiative is driven by state's landmark 2006 global warming law which seeks to cut California's greenhouse gas emissions by 30%. This regional reduction target will push the local authorities and the building industry to rethink urban renewal in California. Simply put this new law, SB 375, requires that jobs, recreation and housing are planned in a way that Californians can live and work closer together, and drive less. It will help to create alternative mobility options and improve the community. The state spends billions on transportation, and under the new law, projects that meet climate goals would get priority. This will also allow enormous fuel savings. This is a new agenda for transformation of the community. After all, the number of miles Americans drive has risen at more than double the rate of population growth in recent decades.

California will witness significant population growth in the coming years and will have to provide for as much as 50 million people. This will escalate demand for housing and commercial space. This new growth and investment in new built up area is an opportunity for the state to integrate the principles of the new policy and to have better designed communities.

European cities opting for traffic calming measures: Traffic calming measures and strategies adopted by Dutch and German city planners have greatly reduced road accidents and have benefited pedestrians. Traffic calming primarily refers to limiting of motor vehicle speeds and reduction of traffic volumes on a particular roadway through various design measures and strategies. Traffic calming measure allows pedestrians, children and other non motorised users to enjoy the neighbourhood streets as much as the motorised users. In both Netherlands and Germany these strategies are implemented on an area wide basis and not on isolated streets.

The European cities have managed to reduce traffic speed by law – by limiting motorised vehicular speed to 30 kilometers per hour and through physical barriers like raised crosswalks and intersections, traffic circles or round about, road narrowing, zigzag routes, speed bumps and speed tables, and artificial dead ends created by street closures.

The Dutch cities had adopted the most developed form of traffic calming – the Woonerf that imposes even more restrictions on car users with cars required to travel at walking speed near schools, offices and recreational opportunities. Germany adopted traffic calming measures as early as 1977, Denmark in 1978 and Austria and Switzerland followed suit in 1983 and 1984. In Germany, in addition to strong legislative measures that supported pedestrian rights, pedestrian precincts were also created. In 1988 the Netherlands planning community has recognized the wider application of traffic calming, and included shopping centers and other community areas.

In Europe the second generation traffic calming measures are stronger than the first generation measures as they are supported by guidelines and legislations and could be further enhanced through educating the public about traffic calming measures in addition to limiting traffic speed and installing physical barriers to check traffic

THE EUROPEAN CHARTER FOR PEDESTRIAN RIGHTS

The European Parliament in 1988 had adopted the European Charter for Pedestrian Rights that endorsed pedestrians also have a right to live in healthy environment and enjoy the various amenities of life. It comprehensively outlines the need of the pedestrians and their right of admission on streets.

I. The pedestrian has the right to live in a healthy environment and freely enjoy the amenities under conditions that adequately safeguard physical and psychological well-being.

II. The pedestrian has the right to live in urban or village centres tailored to the needs of the motor car and to have amenities within walking or cycling distance.

III. Children, the elderly and the disabled have the right to expect towns to be places of easy social contact and not places that aggravate their inherent weakness.

IV. The disabled have the right to specify measures to maximize their independent mobility, including adjustments in public areas, transport systems and public transport (guidelines, warning signs, acoustic signals, accessible buses, trams and trains).

V. The pedestrians have the right to urban areas which are intended exclusively for their use are as extensive as possible and are not mere pedestrian precincts' but in harmony with the overall organization of the town, and also the exclusive right to connecting short, logical and safe routes.

VI. The pedestrian has a particular right to expect (a) compliance with chemical and noise emission standards for motor vehicles which scientists consider to be tolerable; (b) the introduction into all public transport systems that are not a source of either air or noise pollution; (c) the creation of 'green lungs' (d) the fixing of speed limits and modification to the layout of roads and junctions as a way of effectively safeguarding pedestrians and bicycle traffic; (e) the banning of advertising which encourages and improper and dangerous use of the motor car; (f) an effective system of road signs specially child friendly; (g) adjustments to the shape and equipment of motor vehicles so as to give a smoother line to those parts which project most and to make signalling systems more efficient. (h) the system of risk liability so that the persons creating the risk bears the financial consequences thereof; (j) a drivers' training program.

VII. The pedestrian has the right to complete and unimpeded mobility, through the integrated use of the means of transport. In particular, pedestrian has the right to expect an ecologically sound, extensive and well-equipped public transport service, facilities for bicycles throughout the urban areas; parking lots that affect neither the mobility of pedestrians not their ability to enjoy areas of architectural distinction.

VIII. Each Member State must ensure that comprehensive information of the rights of pedestrians and on alternative ecologically sound forms of transport is disseminated through the most appropriate channels and is made available to children from the beginning of their school career.

volume. This has resulted in significant reduction of crashes and fatalities in Germany and Netherlands. In Netherlands crash has reduced by 80 percent. In Germany the number of casualties reduced by 35 to 60 percent and in Great Britain by 24 percent.

In Europe the third generation traffic measures are on the way that includes a host of measures that deals with speed reduction. Transportation system management is encouraging ecological modes of transport.

Most of the suburban developments in German and Netherlands have commercial, cultural and service establishments within a distance that are easily accessible by foot or bi-cycle. They are located close to cities and towns and are connected by a fine mesh of local streets that have sidewalks and cycle routes. The proximity to cities reduces trip distance and the finer grain of the local street network allows people to choose roads that are less heavily travelled and are less crowded. The buildings are never surrounded by parking lots and the parking lots are relegated to the back of the buildings or are built next to them thus providing easy access to pedestrians and other non–motorised users.

Driver training institutes are far more expensive in European cities and a crucial

aspect is that the drivers have to yield to pedestrians and cyclists. It is assumed that pedestrians and cyclists will make wrong moves but the motorists have to be careful and forestall such moves by carefully noting the presence of bi cyclists and pedestrians along the route. The aptitude of anticipating such moves by non motorised users forms a significant component of the driving license test and most people fail to qualify such tests. Also motorists are trained to drive carefully minimising the risks of injury to pedestrians even if they are jaywalking, ignoring traffic signals or behaving contrary to traffic regulations.

Also, traffic education is imparted in schools in Germany and Netherlands through co – coordinating with the traffic police department. All children by the age of 10 receive comprehensive education on safe walking and cycling. Having the right of way by law does not allow motorist to enjoy unregulated freedom.

When accidents are caused due to illegal moves by pedestrians the motorists are partly at fault but if injuries are caused to the vulnerable population – a child or an elderly person then the motorists are completely at fault. In Netherlands and Belgium, in accident cases with pedestrians and cyclists, the insurance company of the motorists pays up for the damages automatically irrespective of guilt.

Furthermore, German and Dutch police are very strict on penalty on motorists, pedestrians and cyclists if they do not comply with traffic regulations. In Netherlands pedestrians have been allowed to jaywalk legally since 1997.

United Kingdom: Variety of measures have been adopted in the United Kingdom to promote pedestrianisation. These include:

Home zones: The British have developed the Home Zone concept for neighbourhoods. Policies allow the authorities to designate streets as Home zones. These are primarily residential streets with limited traffic speed within which street activity including playing is treated as lawful. Design speed varies from 20 -10 miles per hour. Signages is posted to indicate the special status of the zone. The federal government allows the local government to plan, design and implement such programmes through financial assistance. The key measures in home zones include traffic calming, on-street play facilities, community space, pro-active attention to parking issue, use of planters and planting and environmental enhancement.

Studies show that pedestrianisation of shopping areas actually have positive effects on sales. Car free development will actually create more job opportunities.

The Oxford city has adopted traffic restrictive measures to create a congenial environment for walking and use of public transit. In Oxford private cars are allowed to ply on all street roads but cannot drive through in the city centre. The local government has adopted bus priority systems especially in the city centre where it is completely pedestrianised. The city administration also provides options of improved park and ride facilities. This has improved walking, cycling and public transit access.

Moving away from subways: Redevelopment plans have been initiated to improve pedestrian ways. The London borough of Hammersmith and Fulham has improved crosswalk facilities to replace the existing subway facilities along the desired lines of the pedestrians. The pedestrian activity at certain crossings increased by about 300 percent after installation of at grade pedestrian facilities with significant increase in flows in all other crossings compared to subway usage.

Traffic calming to offset the safety impacts of increased speed of traffic: The London Congestion Charging Research Programme shows that traffic speeds can be increased by 27 percent if a congestion charge of pound 8 per day on one way is

imposed. Imposition of a £5.00 road user charge in Central London may result in an increase in vehicle speeds of 20 percent. Such increase in speed in Central London therefore warrants traffic calming measures to ensure road safety. This also necessitates the reallocation of road space to buses, pedestrians and cyclists. The main objective of the congestion pricing strategy is to deliver improvements in journey time reliability rather than increases in speed for vehicles paying road user charges, hence, bringing greater certainty of travel for all road users.

A number of concerns have been raised, particularly in Outer London that a reduction in road space capacity on the secondary network through the reallocation of road space to buses, pedestrians and cyclists, could result in spillage of traffic onto local residential roads. Experts have stated that such situations can be reigned in by implementing traffic calming measures in the local residential streets in collaboration with the road space reallocation programme.

Auckland has enacted Land Transport Rules that has laid down elaborate rules for pedestrian protection.

Switzerland: The Swiss strolling zones of the federal government was another endeavour to reduce traffic speeds and facilitate pedestrian mobility. The Swiss federal government has established "Begegnungszonen" (strolling zones in downtown commercial districts). These strolling zones were primarily pedestrian zones where narrow carriageways made car speed very low. This concept has been adored equally by residents and business people and has been adopted by 20 communities in Switzerland.

The Dutch and the German cities have adopted stringent auto restrictive measures to promote walking and other non – motorised form of transport. Use of raised crosswalks, pelican signals, priority signals for bicycles, direction and turn restrictions for car users, all deter car use.

Most of these cities have reduced the supply of parking in pedestrianised areas. Parking facilities are established in downtown edges to discourage auto travel to the core of the cities. Increasing parking prices is another effective instrument for reigning in auto use. In some cities, residential parking permits are required for on street non metered parking and special limited parking meters in residential areas can further curb usage of cars in residential areas.

Australia and Canada: Traffic calming Measures have also been widely adopted by Australia and Canada. In Australia during the 60s and 70s traffic calming measures primarily concentrated on removal of non local traffic on prime routes and this affected the local streets. Though the efforts of the city government received lukewarm success, in subsequent times they made concerted efforts to reduce traffic speeds and volumes along the lines of European nations. This mechanism is still followed for neighbourhood traffic management. However, the efforts to regulate traffic speed and volume on the local streets gradually spread into a city wide programme to reduce traffic and also manipulate land use transportation system. In Australia traffic calming efforts concentrated at three levels. Level I traffic calming measures deals with the local streets in the neighbourhoods, the level II traffic calming measure for those on traffic routes and the third level refers to a city wide programme.

Auckland: Auckland has enacted the Land Transport (Road Users) Rule 2004 that has laid down elaborate rules for pedestrians. It has laid down that a driver must not drive a motor vehicle along a footpath; driver must not stop, stand, or park the vehicle on a footpath or on a cycle path; driver entering or exiting a driveway must give way to pedestrian on a footpath; A driver must not stop, stand, or park the vehicle on a pedestrian crossing;

REGULATIONS IN UNITED KINGDOM

United Kingdom has several set of laws and regulation related to roads. The principal enactments in UK are the Road Traffic Act 1988 and the Road Traffic Offenders Act 1988 (both as amended and extended by the Road Traffic Act 1991), the Road Traffic (Consequential Provisions) Act, 1988 and the Road Safety Act 2006. There are also enactments that govern management of road traffic. These are the Road Traffic Regulation Act of 1984, Traffic Management Act of 2004. The Road Traffic Regulation Act 1984 is an Act of Parliament in the United Kingdom, which provided powers to regulate or restrict traffic on UK roads, in the interest of safety. The traffic authorities under this act have the powers within London to make traffic regulation orders to control traffic including pedestrians.

A traffic regulation order may be issued for avoiding danger to persons or other traffic using the road, for facilitating the passage on the road or any other road of any class of traffic (including pedestrians), among others. Authorities may issue an order for controlling or regulating vehicular and other traffic. They can impose any restriction on the use by vehicles on streets in Greater London. There can be order to indicate the time at which a vehicle arrived at, and the time at which it ought to leave, any place in a street in which waiting is restricted by the order.

The Road Traffic Regulation Act of 1984 and the Traffic Management Act of 2004 deal with factors like provision of pedestrian crossings on roads, near schools railway crossings, experimental traffic schemes, placement of bollards, speed limits on roadways, enforcement of the rules under this act and charging penalties on contravention of provisions under this act. There are also enactments under The Quiet lanes and Home Zones Regulations of 2006 for road traffic signages and for constituting "Home zones".

The London Walking Plan 2004 and the Walkability Improvement plan 2005, includes a host measures to improve walkability and is a step further towards regulating traffic movement and reducing congestion. The Plan aims to provide guidance to the local authorities on how to improve and maintain walking conditions in their administrative units. The plan has been developed with a vision to make London one of the most walking friendly cities by 2015. The vision further states that walking should be adopted as the first choice for shorter trips and long trips should be a combination of walking and public transport. The walking plan for London has devised an action plan to set up London-wide targets for suggesting approach to develop targets in the form of increased walk trips at the local authority level and identify actions needed to improve pedestrian conditions.

The above objectives can be achieved through a series of local area strategies and policies that are to be framed and adopted at the borough level (administrative units). The strategies can suggest how needs of pedestrians can be prioritised and balanced with other competing demands in planning and management within transport sector and other sector.

The walking plan for London 2004 states its objectives as — Stopping the decline in the number of walking journeys per person; Increasing the proportion of trips made on foot; Completing a particular route or network; Setting targets related to specific types of walking, such as for the journey to school as part of Travel Plan targets, or for access to town centres; or it may make mandatory that new development plans will be approved if they are physically integrated with their surroundings or they have provisions for safe walking and cycling.

The next step is to develop a comprehensive policy favouring improvement in walking. The method might be based upon physical targets of per square foot or meter or a financial mechanism of investment per square foot or meter. Also such measures may also be introduced for maintenance and reinstatement of disturbed footways. The process aspect should also deal with mechanisms of assigning weightage to walking in assessing development proposals. The policy considerations should also include aspects like:

- Walking access to and from the site
- Generation of walking activity by the development-meaning the land use
- Capacity and quality of the local network, and opportunities and requirements for improvement
- Inclusion of walking in the Transport
- Assessment (formerly Traffic Impact Assessment) for the development
- Inclusion of measures in the Travel Plan for the development to maximize walking to and from the site;
- Procedures for the carrying out, funding, monitoring, and enforcement of planning conditions relating to walking;
- Policy criteria for adoptable spaces and public right of way;
- Mechanisms for ongoing maintenance of areas accessible to the public
- Design standards to ensure new developments are planned to maximise the quality of walking conditions,

and permeability of developments;
- Avoiding the conversion of private gardens to hard standing and provision of new crossovers that compromise footway quality;
- Protecting footway space. Footway space should not be reduced as a result of new development. Increases should be considered when the opportunity arises. Plans can indicate where increased footway space is required or desirable.
- Fixing missing links in the footway or footpath network. Missing links that could be rectified when development provides the opportunity can be shown on a plan;
- Specifying routes or areas to which new developments should conform and contribute. Such policies need to be backed with plans showing scheme locations. Examples might be:
  - Creation of new public space
  - Creation of new avenues of trees or other landscape features (future maintenance must be borne in mind)
  - Conversion of streets as an aspect of speed management, e.g. Home Zones or 20 mph zones
  - Creation or improvement of leisure walking routes
  - The provision of pedestrian direction signing etc.
  - Reducing street clutter
  - Locations on the road network where higher priority is required or can be given for walking and related activities. Examples of measures might be;
  - Footway widening or upgrading
  - Simplifying pedestrian movements, e.g. replacing staggered crossings
  - Removing guard railings
  - Provision of seating, better street lighting
  - Reducing obstruction by removing street clutter

Asia

Policy interest in pedestrianisation is also growing in Asian cities.

Japan: Barrier free pedestrian facility development measures: In Tokyo Metropolitan Region the number of elderly is increasing as well as number of accidents involving them. This has been brought to special focus in the transport safety promotion plan to build barrier free pedestrian facilities for the mobility disadvantaged. This includes widening of sidewalks, especially to accommodate wheel chairs, and tactile coloured surfacing for visually impaired was added. Signaling including acoustic signaling is being improved to allow the elderly more time to cross.

Busan in South Korea: **Rights of pedestrians:** Busan city in Korea has designed and implemented pedestrian plans. The city has a civic regulation that ensures safe comfortable and convenient environment to pedestrians to guarantee their rights, and improve the environment for pedestrians in a planned and comprehensive manner. Regulation gives every citizen the right to have the information related to the establishment and promotion of measures for pedestrian rights and pedestrian environment improvement. Every citizen has the obligation to actively participate and cooperate with the pedestrian environment improvement operations. The mayor of Busan Metropolitan City, has obligations to guarantee pedestrian rights; improvement of pedestrian facilities; expansion, maintenance, and management of pedestrian-oriented facilities; encouragement and cooperation with citizens to improve the pedestrian environment; and establishment divisions or facilities within the city administration to promote and improve the pedestrian environment. A pedestrian improvement plan is established every five years, along with an annual operational plan. In the plan are planned improvements, the establishment and expansion of pedestrian corridors, a review of current operations, operating costs and suggested financial resources.

Yogyakarta: Pedestrian zone: The city is pedestrianising Malioboro Road an ancient street that is the access to the Sultan's palace. This is an important market and tourist destination. . Through traffic has been rerouted. Several elevated crossings have been made to enable pedestrians to reach this area safely. Only three wheeled rickshaws called becac ply in this area. There has been considerable

opposition from the parking and street vendors to this plan. A dialogue has been initiated with these groups to build support.

Many cities globally including San Franciso, Milwaukee, Portland, Toronto, Seoul, New York have destroyed roadways to create public spaces. There are excellent high quality public spaces in Hong Kong, Singapore and Tokyo.

8. THE WAY AHEAD

It is time to set a whole new term of policy debate that can compel regulators to seek solutions to find a whole new way of organizing cities to improve the quality of urban life. Getting good walk ways is only the first step towards creating non-motorised space in our cities. That is the way other countries have begun to move. As cities begin to scale up public transport systems efficient pedestrian network will become necessary to allow mass of people to move through the public transport network with ease. If pedestrian traffic is compromised public transport usage will deteriorate to sub-optimal level. Reorganisation of urban space to make it more closely knit and walkable is the pre-condition to promoting sustainable modes.

Redesign cities to bring services, jobs, homes closer to enable shorter and walkable trips. Improve engineering and environment of walkways to make walking comfortable and enjoyable and stop motorizing the short trips. Identify key areas in cities that can be freed from motorized traffic to allow the freedom of walking and cycling. Protect them with a strong legal back up.

Indian cities need comprehensive road users act that should target pedestrianisation, mandatory implementation of basic engineering guidelines, enforce traffic volume reduction measures and maintain integrity of pedestrian ways.

Agenda for action

Harmonise existing laws: Urgent steps are needed to harmonise laws and policies at the national and the city level for effective implementation. For instance, JNNURM programme of the Union ministry of urban development provides the mandate and resources to cities and includes provision for pedestrian infrastructure in cities; City Master Plans as in Delhi provide the template for urban planning and pedestrian space; municipal laws have rules to protect and maintain pedestrian space; motor vehicle laws lay down safety rules; Police laws can enforce penalty and compliance strategies; and state laws are expected to protect pedestrian rights. But cities need an effective unified legal framework for effective enforcement.

Pedestrian governance will continue to have decentralised framework as most policy action will take place at the city levels. But both Union and state governments will have to take responsibility to create a more unified legal framework for effective implementation.

Legislate to protect right to walk: Indian cities need a comprehensive Road users act. The state governments in consultation with the union government should initiate a process for enactment of a legislation that will comprehensively address targeted pedestrianisation, mandatory implementation of important engineering guidelines for walkways, traffic volume reduction measures, improvement of street scape, maintaining the integrity of the pedestrian pathways and strongly enforcing penalty on motorized vehicles for encroaching into pedestrian space and so on.

Conversion and acquisition of pedestrian space for motorised traffic should not be allowed without public hearing and proper justification. During construction or

laying down of utilities it is necessary that the pedestrians be notified of the inconvenience and separate diversion route plans prepared and implemented to cause minimal inconvenience to them. It should have composite service planning in the pedestrian space, ensure continuous connectivity and easy and safe crossings. Bind it all together to protect the pedestrian rights.

Current guidelines need urgent revision to improve accessibility and safety to make cities more walkable.

The Law Commission of India in its consultation paper on "Legal Reforms to Combat Road Accidents" in 2008 proposes that the state governments in consultation with the union government initiate a process for enactment of a traffic management and regulation act that would also include the legal rights and duties of pedestrians and bicycles and also govern their behaviour on roads and that of other motor vehicles. Well planned facilities and infrastructure should be an integral feature of all urban roads. It states, "There is no central legislation comprehensively governing/ regulating the use of roads by the pedestrians and non-motorized traffic. It is left to the States to legislate thereon."

This concern has come to forefront especially in those cities that are implementing segregation of space for road users as part of the bus rapid transit system. City officials in Delhi have asked if there is need for separate legislation to lay down the rights and obligations of all road users for better management of the segregated space. If an Act should lay down the guidelines on pedestrian movement and specify who should have the right of way, and what should be the acceptable crossing time for pedestrians at the traffic signals at intersections and effectively regulate volume of traffic. It is time to evaluate the possibility of a comprehensive legislation to enable effective action.

Pedestrian plans should be made mandatory and conditional to infrastructure funding in cities: Effective action is possible if pedestrian plans are made mandatory and conditional to accessing funds for infrastructure development in cities. The framework of the national urban transport policy and the investments for city development under the JNNURM programme need to be linked with mandatory pedestrian plans in cities. CDP is already an instrument to channelise and prioritise funding. This will also help to leverage state government spending on infrastructure and move local action. There is one such instance in Nanded in Maharashtra where major remake of pedestrian ways has been possible as its CDP has proposed pedestrian improvement.

Building a good footpath is only a step towards freeing urban space from motorized transport to reduce congestion, pollution and fuel guzzling. City authorities need to earmark shopping zones, central business districts, places of tourists attraction, heritage places, and even residential areas that can be freed from personal motorized vehicles. This can be combined with non-motorised transport to make services, education and job facilities walkable within neighbourhoods and also within short distance ranges.

Additionally, Union ministry of urban development has mandated cities to prepare mobility plans under the guidelines of the National Urban Transport Policy. These plans must include explicit pedestrian plans. The plan should clearly identify ways to pedestrianise, improve the engineering variables, environmental and service conditions of the pedestrian infrastructure, and continuous walkpath at interchange points to allow multi-modal integration. The city governments must identify funding source, devise a funding mechanism that will ensure regular flow of money to the local authorities. Central government support for the BRT projects that is based on the principle of segregation of road users will be an important opportunity to create a network of dedicated pedestrian infrastructure.

Mandate reformed guidelines on engineering, environmental, safety and aesthetic aspects of walkways and make them non-negotiable: The civic and road building agencies in cities largely follow the guidelines laid down by the India Road Congress (IRC). In addition to this the Urban Development Plans Formulation and Implementation (UDPFI) that functions under the aegis of the Union ministry of urban development and also lays down guidelines.

The current IRC guidelines include guidelines for pedestrian ways but they are old and do not reflect the newer concerns. For instance, the current IRC guidelines are not adequately explicit on the requirements regarding the height of the footpaths. Guidelines are also weak on dipped kerbs and gradients, pedestrian refuge and types. There are also no guidelines on the timing of the signals from the pedestrian perspective or the right of way for pedestrians at non-signal controlled zebra crossing.

The current guidelines need urgent revision to improve accessibility and safety, to make walkways walkable, comfortable and disable friendly, enhance aesthetics and ecological regeneration of the public space. Geometry of roads and walkways will have to reflect the needs of bus users, pedestrians, and fulfill the service needs. Design must allow the pedestrians to remain at grade with comfortable and safe access. The overall road design should allow pedestrians to have the most direct route. Some universal design measures must be laid down and must be adhered to.

It is equally important to design guidelines according to landuse and estimated pedestrian volume. Implementation of guidelines should be made mandatory and non-negotiable.

Delhi has an opportunity to move ahead as it has a dedicated body – Unified Traffic and Transportation Infrastructure (Planning and Engineering) Centre (UTTIPEC) in DDA and under the aegis of the Lt Governor of Delhi. UTTIPEC is in the process of finalising the guildelines for pedestrian infrastructure in Delhi.

This will not be an easy transition. As roads are being designed increasingly for motorists pedestrians are being pushed to foot-over bridges or subways that are not convenient for them. Pedestrian network needs to remain continuous and connected, and at grade. If separated by heavy traffic roads appropriate and safe surface level crossings should be provided. As much as possible grade separated structure should be avoided to prevent unnecessary detours to reach destinations. The placement of bollards and signages should also be specified. Space will have to be planned for hawkers and utilities including drinking water kiosks and toilets so that the walking space is enhanced but not compromised. Design of refuge islands needs to be planned well with adequate width.

The new investments in road infrastructure will have to be linked with implementation of reformed guidelines for pedestrian ways

Moreover, the level of services in terms of shade, trees, and drinking water services are very poor. Cross walks facilities are so inadequate that it makes pedestrian crossing very unsafe. There is not enough holding area in the median to accommodate the walkers. Overall environment of the footpaths is very poor. Cities need composite streetscape planning to enhance walkability, safety and urbanity.

The most critical aspect of the design is to include design features that are disable friendly. All sidewalks should have floor tactile tiles to guide vision impaired persons. Auditory signals are equally important. Equally important is the ecological enhancement of the walkways.

Moreover, while laying down utilities or during construction of mass transit it is

always the pedestrians and bus commuters who suffer. IRC guideline for Utility (IRC-98-1997), recommends underground utility beneath the footpaths. This leads to frequent disruption. This needs urgent revision. Enough space should be kept for laying down utilities and safeguards built in to prevent disruption of route.

Pedestrians are not involved in decision on major road projects in cities. Also pedestrianisation cannot work if traffic volume is not reduced.

Implement walkability and safety audits: Massive investments are being mobilised for road building and transport infrastructure in cities under the JNNURM and state government programmes. But quality control in construction of footpaths and pedestrian ways is turning out to be a serious bottleneck. The new investment will have to be linked to strict quality control and stringent implementation of the reformed guidelines on pedestrian ways.

Poor maintenance can be as much a contributor to poor quality environment as sub-standard design. The local authority will have to establish criteria and benchmarks for walkability audits and supervise and monitor pedestrian infrastructure based on benchmarks. This will also require supervision of contractors and developers. Standards of street maintenance and cleanliness are necessary for enhancing the pedestrian environment. It is important to take maintenance issues into account when negotiating the design of streets and spaces. The expense of good designs and high quality materials will be wasted unless full maintenance can be assured. This might militate against the use of non-standard surfaces, for example, for which there may be no ready access to replacement materials. Also the likelihood of subsequent street openings for utility repairs should be assessed. If possible, major street improvements should be accompanied by replacement of obsolescent sub-surface utility infrastructure, if necessary with costs apportioned appropriately to the utility companies.

- **Road safety audits are carried out for World Bank funded highway projects. Adapt them for urban roads as well:** Currently, road safety audits are conducted for new highway projects. This is carried out in five stages --- preliminary design stage; post completion of preliminary design; detailed engineering design on a per km basis; construction stage; and pre-opening stage. These audits are caried out by the agencies like Central Road Research Institute (CRRI) and National Highway Authority of India. CRRI has prepared road safety manual in 2002 under the aegis of the Union ministry of road transport, shipping and highways. This is being updated now. CRRI has also prepared a eleven point road safety policy. It is important to adapt similar system for all hierarchy of urban roads in cities.

- **Approval and clearance of all road projects should make adherence to pedestrian guidelines mandatory:** Concerned agencies in cities such as Unified Traffic and Transporation Planning and Engineering (UTTIPEC) and Delhi Urban Arts Commission (DUAC) in Delhi, must make it legally binding for the road construction agencies to meet all the stipulated guidelines. This should be made the basis of approving road projects. The guiding principle has to prioritise the provision of pedestrian, cycling and public transport infrastructure. For this purpose the approving agencies will have to standardise formats for submission of project details and and make it available for public scrutiny.

Public transport plan needs linkage with pedestrian plan: Cities like Delhi have begun to implement mass transport systems. With right policies this should see a massive increase in pedestrian volume. Pedestrian ways will also play an important role in multi-modal integration. This will be a crucial link between the metro system and bus rapid transit systems evolving in Delhi and other cities. Management of the last mile that is mostly a walk trip facilitates transfers from origin to public

transport nodes. Delhi has witnessed conscious development of dedicated pedestrian ways only with the evolution of the BRT system. Without such facilities public transport systems will function at a sub-optimal level.

Need zero tolerance policy for accidents: Mobility network needs to be built in a way that people are able to move around cities freely without the risks of accidents. It is the responsibility of society and the governments to protect them. Fatalities and injuries from road accidents is unusually and unacceptably high in Indian cities. There are substantial costs associated with accidents. The responsibilities of the urban planners is to design safe environments for pedestrians. Traffic and people do not mix. The future urban road guidelines will have to provide for dedicated pedestrians ways along arterial roads and at interchange points. Points out David Banister, transportation expert from Oxford university, "In the EU there has been a huge move towards reducing accident rates through a variety of measures such as slowing traffic down, separation of vulnerable people from motorised traffic, through education, and through having more pedestrian crossings and fines for violation of pedestrian space. Sweden in fact has zero road fatality policy."

Commonwealth Games is an opportunity for Delhi to rebuild pedestrian space: Massive investments have been earmarked for the Commonwealth Games 2010 in Delhi. Money earmarked for road infrastructure is enormous. But this also demands that the fundamental principles of the road design will have to attach primacy to pedestrians and public transport. Delhi Development Authority is currently revising the guidelines for urban roads and pedestrian infrastructure. This should address this critical need.

Need special focus on small and medium towns for pedestrian infrastructure: Small and medium towns where the problems of mobility have just begun to manifest must make these interventions during the early stages of development and growth. The Union ministry of urban development has a national programme on Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT). The schemes that are permissible under this programme include construction/upgradation of roads, and highways/expressways. It is important to make explicit provisions for pedestrian infrastructure in these towns. Pedestrian plan should be made mandatory in these towns. Pedestrian and bicyclist facilities should be designed along all roads and intersections. Designing of such infrastructure should also integrate the needs of the handicapped and the disabled.

Involve pedestrians in decision making on use of roadspace: The current regime cannot protect pedestrian space if it is taken away from the walkers to make way for road widening and road elevation to meet the needs of motorized traffic. Pedestrians are not included in these decisions. Municipal and development agencies are not held liable if the engineering guidelines for footpaths are not adhered to; if disable friendly designs are violated, arbitrary decisions on grade separated pedestrian ways are not prevented. Authorities are not made accountable. Environmental impact of major urban road development projects should be assessed. Pedestrianisation should be included in the pollution and congestion mitigation strategies.

Pedestrianisation can work only if modal conflict is minimised

Implement measures to reduce traffic volumes and traffic calming measures: Pedestrianisation cannot work if the modal conflict between pedestrians and motorized traffic cannot be minimized. Only this can enhance safety and walkability. Also city authorities should have powers to reduce traffic volume in targeted areas at peak time.

Already, in most arterial roads in Delhi the volume of traffic has exceeded the designed capacity of the roads. This inadvertently qualifies important arterial roads for uncontrolled grade separation and elevation if uncontrolled increase in traffic volume is assumed. That is not sustainable. Therefore, policies will also have to simultaneously provide for traffic volume reduction plans.

Only laws and engineering design cannot transform cities. Policy and societal attitude need to change.

As we have seen earlier London Road Traffic Reduction Act 1997 authorises local traffic authorities to prevent further traffic growth during the peak and other periods. Authorities can set local targets that might need increasing vehicle occupancy or increasing use of other modes of transport. The Act gives power to the local authorities in London to set targets for traffic volume reduction in an area etc.

Indian civic authorities also need to work on traffic volume reduction and calming measure, enhancement of pedestrian environment, restraints on use of automobiles and conversion of the motorised trips to non motorised and public transit trips. They should take stock of the trips demand in the area and work on strategies to increase modal share for walking, use of non – motorised transport and public transit. They should prepare a road map with targets and associate it with reduction in pollution levels.

Only legal back up and design guidelines cannot help. Need change in attitude: The urban local bodies and road building agencies will have to accept that the best way to change is to create more public transport and walking oriented movement network. Policies will have to attach priority to pedestrians, cycling and public transport. It is also important to separate people from traffic and enhance and respect non-motorised public space. There has to be social pressure to lower levels of vehicle speeds and accidents. This needs change in policy mindset.

If the infrastructure design gives priority to public transport, pedestrians and cycling the mobility paradigm can be transformed and made more sustainable. JNNURM strategy in public transport, mission on sustainable habitat that outlines the public transport strategy under the National climate action plan and the interventions that have been planned in various cities as part of clean air and mobility and development plans will see massive mobilization of investments in the near future. It is important to influence this investment with right policies and priority. It is possible for these cities to have people centric focus while moving to higher quality of public transport and an urban way of life that is dominated by walking and cycling.

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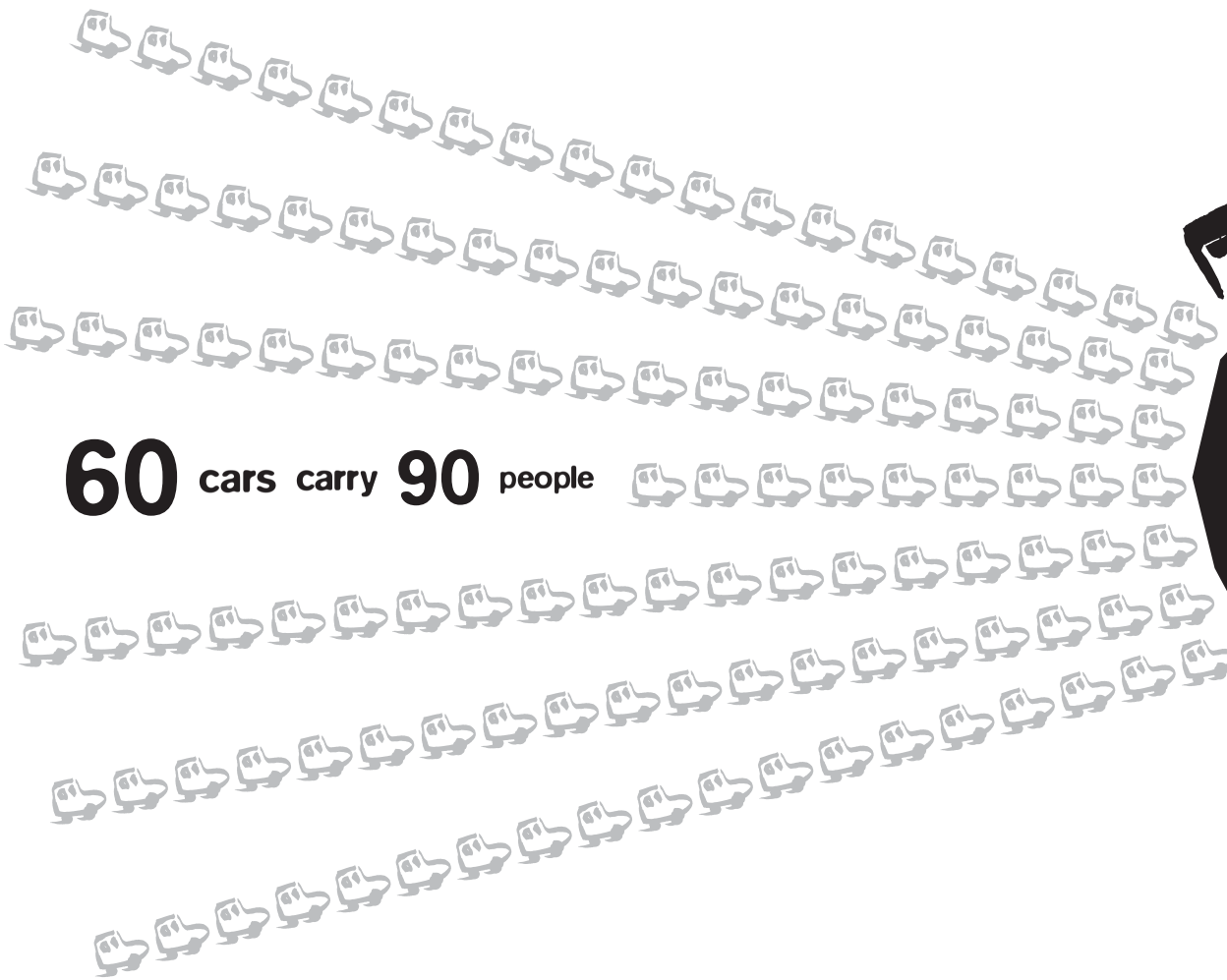

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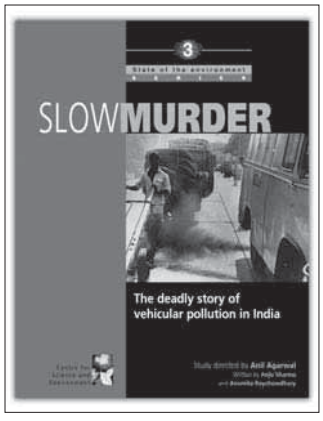

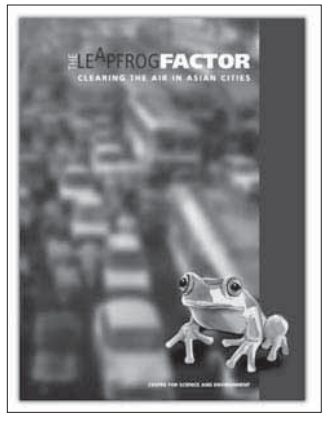

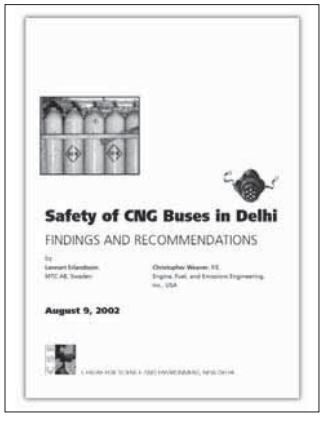

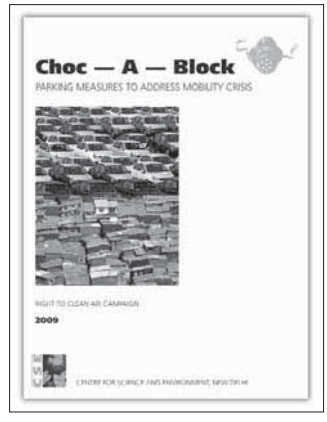

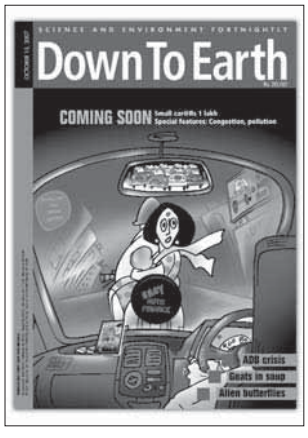

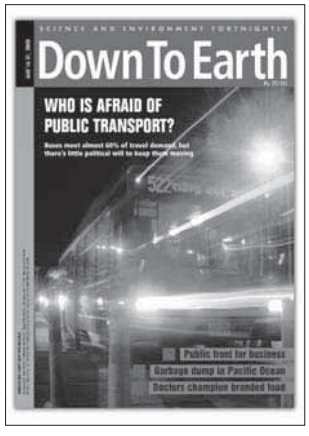

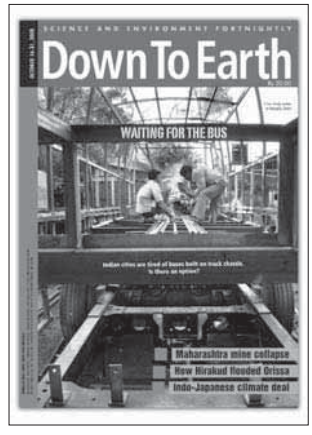

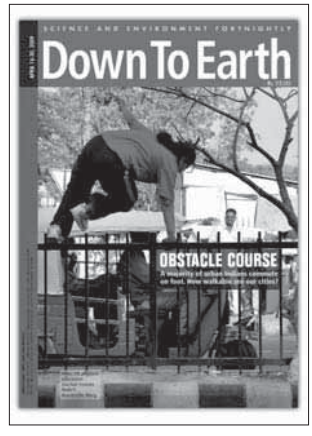

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