Introduction

Like all developing cities, Chennai is growing rapidly and will need to constantly upgrade its infrastructure for the future. The city is densely populated and is expanding rapidly. Transportation plays a very important part of the development process and the expansion of the city. But in the process of building new and large scale infrastructure, smaller things like sidewalks are being completely ignored.

The number of cars in Chennai is currently rapidly increasing. There are 22,65,600 registered vehicles of which 18,10,892 are two wheelers and the number of vehicles is growing at an average of 10% per annum. (Government of Tamil Nadu, 2010) On an average, 1,780 new vehicles are being put on the Chennai roads every day without a corresponding increase in motor able road space. This has led to a low speed of 15 km/h in CBD and 20 km/h in other major roads. (Chennai, (August,2008))

So far, the government has only taken one strategy to improve mobility: increasing the availability of road space. The Chennai Traffic and Transportation Study (CTTS) conducted in 2008 recommends the construction of eight elevated corridors in various parts of the city covering a total length of 77 km.

But how much good will this expanded capacity do? Research shows that every time road expansion has taken place, congestion levels go up within five years saturating even the newly built lanes. Addressing road congestion by increasing road supply is a never ending spiral. (Srivatsan, How far do flyovers help in easing traffic congestion? , 2010)

Thus, in order to ensure that the city remains congestion free and environmentally sustainable, policies will need to shift from increasing supply to decreasing demand for roads, from car- dependent suburbanization to pedestrian friendly and public- transit oriented development. For this change to happen the local government will need to discourage private vehicles in high traffic zones using tools like levying a congestion tax, improve public transport and create infrastructure for non motorized transport (NMT) and pedestrians.

Representation of the problem:

1. Availability and Accessibility/ Mobility:

Pedestrian facilities are lacking in the city. The CMA (Chennai Metropolitan Area) has nearly 1,200- odd km of roads of which only about 20 km have 1.5 m wide footpath[1]. There are 217 major traffic junctions in the city and only 36 have signals to regulate pedestrian crossing. This is in spite of the fact that many places in the city like Broadway and the junction in T. Nagar bus stand see more than 10,000 people an hour, comparable to the number of cars that go through Madhya Kailash at peak hour. (Srivatsan, Need for Evolving a Hassle- free system for pedestrians , 2010)

The CTTS for the CMA, reports that only 20 per cent of the roads in the city have footpaths. (Srivatsan, Need for Evolving a Hassle- free system for pedestrians , 2010). Even existing pavements are not always usable for pedestrians. Wherever motorized traffic becomes a bottleneck, the carriageway is broadened without considering the pedestrian traffic on the same road forcing pedestrians to share space with the vehicles and exposing them to danger. In some parts of the city, the pavements exist, but are encroached upon by street vendors, utility boxes, trees, parked vehicles and other impediments, or are simply unfit for walking. Parked vehicles block access to the abutting footpath, forcing the pedestrian to walk on the roads.

[1] According to IRC (Indian Road Congress) 86- 1983, The minimum width of the footpaths should be 1.5 meters and those parts of footpath immediately adjoining buildings, fences, trees and other obstructions, which will not be available for free movement of pedestrian should be disregarded while calculating the width required.

The lack of facilities is particularly surprising considering the share of trips that are actually made on foot. According to a recent Wilbur Smith report 52% of trips in Chennai are short distance trips i.e. of <5kms and a large sum of these trips under 2kms are made on foot. The average per capita trip rate in Chennai is 1.6 and the share of pedestrian trips out of the total number is around 32%. (DMRC, 2005)

In contrast to the share of trips made by pedestrians there is a very small area of less than 2% designated for their facility.. Chennai has a "Walkability Index"[2] of 0.77, lowest amongst the four major metros with Delhi at 0.87; Mumbai at 0.85 and Kolkatta at 0.81. The measure indicates the cities scoring index closer to one are more walk able. This reflects that Chennai is less pedestrian friendly than the other metros. (Associates, Wilbur Smith, May, 2008).

2. Safety and Security:

The studies on traffic and transportation of the city do not give much attention to its pedestrian facilities especially about its condition, usage, safety and convenience. Road safety has been ignored, which is why nearly 42 per cent of all road accidents that occur in the city involve pedestrians.

The trend for fatalities from accidents in the city for the past three years has been stagnant but has increased drastically in the suburbs. This could probably be attributed to the slowing traffic and congestion in the city. If suburban figures are included, then the traffic fatalities in the city in 2010 has increased to 1,415, the highest in the last 10 years, putting it second next to New Delhi's 1,978 in 2010. (Srivatsan, Fatal Accidents has tripled in the last ten years, 2011) It is also not likely that this number represents the total number of traffic fatalities in the city.

How safe can pedestrians be with unsecured crossing areas, dilapidated footpaths, and missing guard rails and grade separators at the city's traffic junctions? How will the Road safety policies of the state government meet its target of 20% reduction of fatalities and injuries by 2013 if they are not able to protect the most vulnerable of all road users the pedestrian?

3. Legal Provision for pedestrians:

Laws and guidelines defining the amount of space to be given to pedestrians exist, but they are not implemented or enforced. The IRC (Indian Road Congress) has developed guidelines for pedestrian facility in IRC 103-1988, where the provision and width of sidewalks is defined by the pedestrian traffic on these roads by the IRC. However, these guidelines are rarely followed while designing the Right of Way (ROW).

The National Policy on Urban Street Vendor, 2009[3], advocates vendor zones and gives the street vendors a right to earn their livelihoods, but no similar policy exist discussing the right of pedestrians to commute on the road.

The laws related to land and local governance falls under the state list in the Indian constitution. The state defines metropolitan, regional and area plans under the Town and country planning act. It is left to the local government to formulate the Development Control Regulation (DCR) and the master plan.

Although, Tamil Nadu has a Road safety policy and a district level commission under the district collector to promote road safety, prepare road safety plans with special attention to accident prone spots/ stretches, maintenance of road, accident analysis etc there is no specific policy attention to pedestrian facilities per say.

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[2] Walkability Index is calculated as (W1 X Availability of footpath) + (W2 X Pedestrian facility rating); where W1 and W2 are parametric weights (assumed 50% for both). (Availability of footpath = footpath length / Length of major road). (Pedestrian facility rating = Score estimated based on opinion on available pedestrian facility).

[3] http://jeevika.org/wp-content/uploads/street-vendors-policy-2009.pdf

Since August 2009, the state government has introduced a road safety tax on new automobiles to take measures on providing and promoting road safety. Fixed charges of Rs.250 for motorcycles; Rs 1,500 for cars and Rs 2,500 for other motor vehicles are being collected. The collection between August 2009-January 2010 amounts to about Rs 28 crores. (T.Ramakrishnan, 2010) . But where is the road safety and in which area is this money being spent on?

The committee taking care of the road safety constitutes of Commissioner of Police, reputed (Non Governmental Organisation) NGOs, and the Consumer Action Group. In Chennai the road safety committee is under the chairmanship of commissioner of police.

As the road building and defining the street structure rests with the development authority and the urban local body their representation in the committee is essential to take any actions. Road safety could be considered a health, traffic engineering issue which is dealt by the urban local body. Their involvement will make them more accountable on delivering required infrastructure for reducing accidents.

4. Pedestrian Facility Design and Participatory Planning:

The sidewalks are treated more like a space for services and other miscellaneous activities rather than a dedicated space for pedestrians. From street lights and utility boxes to drains and manholes to informal urinating spots all these services run under, over, or on the sidewalk. Deteriorating footpath space discourages people to walk on them and force them to use the carriageway.

Other design shortfalls discourage the use of sidewalks. In a city like Chennai where we have almost six months of monsoon and a very hot summer, there are no covered sidewalks, the only cover is the nearest bus shelter which may or may not have a canopy, and the amount of natural tree cover is also decreasing. Sidewalk widths are also not aligned with local needs. Although IRC 103-1988 guidelines suggest varying width of sidewalks based on the pedestrian traffic per hour, this guideline is not being followed. Besides, it does not highlight how the land use of the surroundings affects pedestrian traffic. For example, near a metro station, there will be higher traffic during peak hour and little during the nights.

There are existing methodologies for calculating the width of the road according to the intensity of use by different kinds of users. Hermann Knoflacher a professor in the Institute for transport planning formulated an Equi-Area Concept, which states that based on the people traffic analysis meaning the number of people commuting through different modes, the area on the road should be designated. This concept could transform the street structure if adopted as it harps on the space allocation based on the traffic of people commuting and not vehicles.

It must be noted that the views of the residents of the areas and the users of the road are never asked before designing the street structure. This should be made mandatory as the residents and the users are the ones who get affected due to an uneven planning of the road.

5. Public Expenditure on pedestrian facility:

There are planned expenditures for pedestrian infrastructure. The second master plan of the city highlights that Rs.209 Crore will be spent on pedestrian infrastructure of which Rs. 48 Crore will be spent on the pavements. Looking at the condition of the sidewalks, it does not seem as if the money being spent has in any case yielded consistent and quality results. In contrast an enormous sum of Rs 6200 Crore is being spent on elevated highways considering commuting by cars and two wheeler form only 23% of the total trips. (Authority, 2008) The budget allocated for pavements in the 2010-11 budgets was Rs.45 lakh, where all the zones except zone X have been allocated Rs. 5 lakh each. (Chennai C. o., 2010)

Even so, existing infrastructure is not always the best for pedestrians. Although grade separated pedestrian facilities in the form of Subways and FOBs are required in heavy vehicular and pedestrian traffic areas[4], it is very inconvenient and taxing to use. It has been criticised world over by leading

[4] According to IRC:103-1988, these grade separated pedestrian facilities are required in the following cases:

urbanists and architects. Cities like New York and London have no pedestrian underpass or FOBs to cross a busy road instead the pedestrian exercise their rights by patiently waiting for their signal.

Need for the Study:

1. Road Safety:

As road safety has become the tenth leading cause of death in the world and at this rate it is expected to become the fifth leading cause by 2030. Every year 1.3 million people die and several more get physically impaired for life due to road accidents and almost half of them are travelling on foot. As pedestrians are the most vulnerable in being involved in an accident, it is imperative that adequate consideration should be given to their safety. ((WHO), 2009)

According to the Tamil Nadu state traffic planning cell in 2009, there were 13,746 people who died in vehicle mishaps of which 4,663 were pedestrians. Of these 1209 died while crossing roads, 2,172 while walking and 689 while standing on the road. On an average 13 pedestrians fall victim to road accidents, every day in the state. (Sivan, 2010)

2. Missing public Realm and Urban Regeneration:

Although the city is fairly green and has adequate parks and gardens there is still an element of street life that is missing in the city. Streets are used not just for commuting but also socialising, displaying abilities and enjoying a public life. A colourful and happening sidewalk is a display of better public life in the city. This could only be achieved if this space is used and designed properly. By improving the sidewalks we could join these missing elements of the street and complete the puzzle. It will also help people to achieve a better social and public life and keep the city secured.

With a renewed Urban Infrastructure and world class public transport like the Metro, BRTS (Bus Rapid Transit System), the city will have a new look but will be incomplete without regeneration of the sidewalks.

3. Environmental degradation and exclusive city:

Walking is the cheapest, environment friendly and a very convenient mode of commuting short distances but with the rising vehicular traffic and diminishing pedestrian facilities it has become a nightmare to do so. The transportation sector currently accounts for around a quarter of all greenhouse gas emissions, a growing portion of which comes largely from cars and trucks. Does pollution pay parity exist in this case?

Is it justified that the increasing vehicular traffic eats away the footpath space, for the expansion of the carriageway? Pavements serve several functions beside commuting like livelihood and dwelling place making it an inclusive element of the city. Thus, it is accepted that the more facility you add more will be its usage. So why not increase sidewalks at the cost of a little more carriageway to see if it increases pedestrianisation?

Methodology:

Thus, it is necessary to take a stock of pedestrian infrastructure available, and substantiate the necessity of filling the gap by analyzing the various problems faced by the pedestrians. To analyze the problem, the

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1. Volumes of pedestrian and vehicular traffic are so large that intersection of an exclusive pedestrian phase will increase the cycle time for traffic signal beyond 120 seconds.
2. Vehicular traffic demands uninterrupted flow as associated with major arterial roads and expressways;
3. Control at grade pedestrian crossing decisively fails to mitigate the problems of pedestrian vehicular collision. Visibility of grade separators must be checked against delay costs for both pedestrians and vehicle users including increase in vehicle operating costs inflicted by increased delays.

pedestrian facility available is required to be mapped so that there is a wider understanding with the context of the city. Following things could be mapped under the pedestrian layer:

Pedestrian Facility Layer:

1. **Grade Separators (Subways and FOBs):** Mapping this will help in understanding the junctions which have high pedestrian and vehicular traffic in the context of the city. An assessment of its functioning could be made to analyze whether such facilities work optimally, and whether it could be replicated in other parts of the cities. *Data to be gathered from: City Road division (Highway Department); Bridges Department (Municipal corporation of Chennai).*

2. **Sidewalks/Pavements/ Footpaths:** The IRC defines a footpath as the space by the side of the road identified for pedestrian walking purposes. The minimum width of the footpaths should be 1.5 meters and those parts of footpath immediately adjoining buildings, fences, trees and other obstructions, which will not be available for free movement of pedestrian should be disregarded while calculating the width.[5] Mapping this will show the roads and stretches having pedestrian facilities in the city. It can be further categorized into usable and unusable footpaths based on the discretion of its design and accessibility. *Data to be gathered from: City Road division (Highway Department); Bridges Department (Municipal corporation of Chennai).*

3. **Pavements occupied by vendors:** Vendors operate in areas having high pedestrian traffic. Mapping the areas encroached by the vendors will ease the argument of broadening the sidewalk for improving mobility and if the width of the road does not permit to have private vehicles these areas could be declared pedestrian zones like Chandni Chowk in Delhi or Charminar in Hyderabad. *Data to be gathered from: Chennai Municipal corporation, vendors and hawkers association.*

4. **Signalized Intersections (Regulating Pedestrian Crossing):** Studying this will help in analyzing the effectiveness of this facility when compared to the areas having grade separators. As mentioned earlier in the article there are 217 major traffic junctions in the city and only 36 have signals to regulate pedestrian crossing. *Data to be gathered from: Chennai Traffic Police.*

5. **Zebra crossing, one ways and gaps in medians for pedestrians to cross:** They are essential to map for understanding the intervals between the pedestrian facilities. *Data to be gathered from: Chennai Traffic Police.*

Related Layers:

6. **Pedestrian Traffic Count:** This could be used for understanding the pedestrian traffic at major junctions and when overlaid on the sidewalk, subway and signalized intersection layer it will help in assessing the adequacy of the facilities. In the CCTS Wilbur Smith and Associates has surveyed 49 junctions. Some more traffic junctions could be surveyed and mapped. *Data to be gathered from: CCTS raw data, survey.*

7. **Accident Prone Zones:** This data will be a record of accidents involving pedestrian in the city in the past five years. This could be mapped as a zone depending on the frequency and fatality of accident. When overlaid on the pedestrian facility layer it will help to analyze the gaps because of which the accident might have taken place. *Data to be gathered from: Chennai Traffic Police*

8. **Walk Audits:** Based on this an area preferably a high pedestrian traffic zone could be studied in greater detail to sort alternative planning through the resident's participation. This will open a whole

[5] *Indian Road Congress IRC 103-1988*

new Pandora of ideas on how to make the city liveable and working out the solutions for their areas. The layers to be mapped for walk audit are described in a separate document. *Data to be gathered: through survey and analysis.*

The mapping exercise will enable us to understand the critical nature of pedestrian facility and its impact on the city as a whole. The results of this co-relation will help in creating a guideline for effective pedestrian facility which can be included while drafting a policy.

Expected Output:

1. Adding a layer of footpath on the Transparent Chennai website.
2. Hold meetings with various government officials, civil society organizations, Residential welfare associations, students and help in the process of creating a livable city.
3. Doing Walk Audits by involving the civil society group to take a stock of the pedestrian facilities in their areas and discussing alternatives for restructuring.
4. Mapping an area where based on the pedestrian traffic count the necessity of pedestrian facilities could be argued.
5. Blog posts for the website on the importance of footpath and exploring many shades of the city in the process.
6. Studying and documenting various ways of creating know-how on the importance of pedestrianisation of the city.
7. Increasing network through outreach and gathering data pertaining transport and road infrastructure.
8. To interact with the citizens through survey to understand their needs for the walking space and create an audience if required for an open forum where the stake holders could express their vision for the city.
9. Writing paper at the end of the research.
10. Help in creating a policy document for pedestrian friendly areas from discussions with the stakeholders and the government.

Conclusion:

A good pedestrian facility and broad sidewalks in the city increases its livability. It will encourage people to walk and hence there could be a reduction in the carbon footprint of the city. This could encourage cities to earn carbon credit and have a clean development mechanism. Pedestrian rights and policy could be made into a pro-poor policy and encourage inclusive growth. It is the most essential requirement for the development of the city.

Besides, improving the public realm it will further increase ridership for the public transport. People will realize that within the available road space it will be difficult to commute by private vehicles because of heavy traffic and hence shift to public transport. The improved, broadened sidewalk will encourage them to walk and account better road safety.

By declaring certain areas such as the central business district and areas near the heritage buildings as pedestrian zones the city fabric could be regenerated. In some cities like Vienna and Paris pedestrian facilities have increased tourism as people love to explore the city by walk.

Lastly, a pedestrian policy is required for them to exercise a right on the road. For a policy to succeed, it should have the users' ideas, mandate and support. To iron out the policy, the end user's participation should be given upmost priority. Hence, an outreach to the people and gathering their views, using which creating a policy demanding their rights on the road will seal this study.

It must be understood that all trips start and end with a walk and all commuters at some point or the other are pedestrian. Hence, however trivial walking is, it needs a legal right on the roads.

"Build cities for people, not for vehicles"

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