Qualitative Analysis of Pedestrian Spaces in the Institutional Zone in Chennai, India.

K.S.RAKESH¹ & ABDUL RAZAK MOHAMED²

¹Research Scholar at, School of Architecture and Planning, Anna University, Chennai – 600025, India.
²Professor, Department of Planning, School of Architecture and Planning, Anna University, – 600025, India

ksrakeshnair@gmail.com, abdulrazak@annuniv.edu

(Revised paper received, June 2010)

ABSTRACT – Nowadays, spaces for pedestrian are becoming increasingly rare on the urban thoroughfares. The explosive increase in vehicular traffic has relegated the pedestrian to subways and over head bridges. The Indian Roads Congress (IRC) has stipulated standards for pedestrian facilities. But, pedestrian amenities, street furniture and context-specific standards according to the location, hierarchy and functions of streets have not been thought of. This research paper presents a report of the existing status of pedestrian facilities in the institutional zone in Chennai city, evaluating them from a qualitative point of view. The evaluation was supported by a study of various standards, which could be used for the design of pedestrian facilities. An evaluation of the stretch was conducted against a checklist of preferred qualities and amenities using a ratings scale. This qualitative evaluation of pedestrian amenities and the overall pedestrian environment reveals serious shortcomings in them that leads to a variety of issues.

Keywords: Pedestrian Spaces, Pedestrian standards, Qualitative evaluation

Background

The quality of life is improved through increased interaction with other community members, healthy lifestyles, and an improved interaction with the surrounding environment. In that sense, pedestrian facilities highly contribute to the enhanced quality of life of the people in urban areas.

Figure 1: The Marina, Chennai

Figure 2: Elliot Beach, Chennai

Ideally, any transportation program should cater to a wide range of community goals such as comfort, security, aesthetics, sustainability and others, in addition to the general transportation goals of mobility, efficiency and safety. This requires an understanding of how transportation facilities relate to the environment, sense of place and social interaction, equally to mobility and access. Transportation is not only the efficient movement of
people and goods between places, but also the experience of moving between places. Human experience within a transportation corridor creates perceptions through which the efficacy of goals related to physical, social and economic environments in a community can be measured.

The following are a few fundamental questions related to various issues concerning pedestrian spaces:

1. Issues related to visual and sensory perception, imageability and aesthetic impact.
   - How does one evaluate the quality of a pedestrian environment?
   - Does the introduction of a pedestrian area help to improve the imageability and quality of life of an urban area?
   - Does the architectural environment influence the quality and success of a pedestrian area?

2. Issues related to climate, vegetation and topography.
   - How does climate and vegetation exert an impact on the usage of pedestrian areas?
   - How does topography of an area influence the use of a pedestrian area?

3. Issues related to design parameters and standards.
   - What are the problems associated with the existing pedestrian areas?
   - Are they being effectively used?
   - Does the size and function of a city matter with respect to its pedestrian areas?
   - How do land use patterns influence the use of pedestrian areas?
   - Should the context (location, land use) determine standards for pedestrian areas and facilities?

4. Issues related to user-friendliness and pedestrian convenience and satisfaction.
   - Can user perception be utilised to frame context specific standards?
   - Can user perception be harnessed to evolve a tool to document the contribution of pedestrian areas to the quality of life of an urban area?

5. Issues related to social (culture, lifestyle), economic and religious aspects.
   - How do we provide the pedestrian his due share of the street?
   - How do our culture and lifestyle exert an impact on the usage of pedestrian areas?
   - How does the economic condition of an area affect the use of pedestrian areas?

The current practice for evaluating pedestrian facilities is comprised of three basic types of evaluation methods:

1. Traditional traffic output methods, based on traffic volumes, reductions in delay in travel time (e.g. Highway Capacity Manual).
2. Capacity-based methods (e.g. Fruin’s method, 1971)
3. Roadway characteristics-based methods (e.g. Pedestrian environment factor).

(Scott, 1999)

**Traditional Traffic Output Methods**

These methods generally use measures which are designed to evaluate the efficiency of vehicular traffic flow and are thus inappropriate for evaluating pedestrian facilities. The model suggested by the Highway Capacity Manual for calculating the pedestrian Level of Service is based upon capacity of the sidewalk, pedestrian flow rate, average speed, and volume/capacity ratio.
Capacity-Based Methods

These methods use the principles of "Highway capacity" which have been suitably adjusted to evaluate pedestrian facilities. They could be appropriate for planning pedestrian facilities, but provide little evaluative information. Fruin's (1971) method, which uses the capacity of sidewalks to evolve a pedestrian Level of Service is an example of such a method.

Roadway Characteristics-Based Methods

These are based on the characteristics of the streetscape on which the pedestrian facility is located. These methods are designed from a pedestrian's perspective. It attempts to quantify the comfort level or stress level of pedestrians while encountering certain roadway characteristics.

The pedestrian environment factor (PEF) is an example of a Roadway characteristics-based method. It incorporates the following roadway or streetscape variables: sidewalk availability, ease of street crossings, connectivity of the street/sidewalk system, and terrain/grade. The PEF values are used to evaluate pedestrian facilities in an area-wide basis, and are most often used in mode choice models to determine the inclination for pedestrian travel.

User Perception Method

This is an alternative which uses actual user inputs in evaluating pedestrian facilities. Human experience within a transportation corridor, whether a highway or a sidewalk, leads to perceptions which could be used to measure the efficacy of goals related to physical, social and economic environments in a community.

In a study conducted by the Institute of Road Transport (IRT), Chennai, about 13,000 persons were surveyed for their opinion about various issues concerning pedestrian safety. The findings of the study have helped to analyze the reasons for not using the pedestrian facilities and major problems faced by pedestrians among other issues.

Table 1: Major problems faced by pedestrians in using urban streets

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage of respondents reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of proper sidewalks</td>
<td>30%</td>
</tr>
<tr>
<td>Lack of adequately safe pedestrian crossings</td>
<td>21%</td>
</tr>
<tr>
<td>Lack of police control over motorists</td>
<td>15%</td>
</tr>
<tr>
<td>Lack of knowledge about traffic safety rules among pedestrians</td>
<td>34%</td>
</tr>
</tbody>
</table>

Source: IRT, Chennai, India

Thus, some of the major issues identified by pedestrians could be classified under Comfort, Convenience and Safety. (IRT, 1990)

A study on the need for pedestrianization of the central area of Calicut city in Kerala highlighted issues such as proper design of sidewalks, insufficient sidewalk widths, and encroachment by parked vehicles, adjacent property and other obstructions, abrupt changes in grade and alignment, and illumination. These could be further categorized under the broad issues of Comfort, Convenience, Safety and Security. (Nagaraj, B.N. et al, 2001)

A study conducted by Appleyard (1981) in San Francisco, USA, helped to reveal pedestrians' preferences about the pedestrian environment. In that study the issues considered 'very important' were Safety, Convenience and Comfort.
Measures Characterizing the Pedestrian Environment.

Various researchers, planners and designers have attempted to characterize the elements of an ideal pedestrian environment. For instance, Kroll (2001) classified the function of streets as: utilitarian equipment, cultural manifestation, and local focal points.

As utilitarian equipment, streets must provide safe, comfortable, multimodal mobility and direct and equitable access to commerce, culture and recreation. As cultural manifestation, major streets and plazas can provide a forum for the celebration of public events and common purposes. Such public spaces then become stages for the expression of larger social and political concerns. Parades and protests are temporary guests of grand streets and plazas which make them possible. As local focal points, streets are unique grounds for individual and community growth. Even in a fast-paced world, such a pedestrian realm affords belonging and love of place.

These three principal street functions provide various stages for the personal experience of walking. This personal experience takes place in a physical, social, and cultural milieu. Any method that attempts to evaluate this multifaceted personal experience should be equally rich in analytical rigor and insight.

Sarkar (1993) offered a definition that an “ideal” pedestrian environment would be one where many activities occur simultaneously without conflicts among users (pedestrians, cyclists and drivers). She further added that the success of any pedestrian design would depend on:

(i) The environment should be user-friendly offering different amenities to pedestrians;

(ii) The environment should be unique and blend with the architectural vocabulary;

(iii) The environment should be visually stimulating.

In another study on comfort of urban walkways, Sarkar (2002) elaborates on the importance of a comfortable walking environment to foster walking as an activity. According to her, comfort can be categorized as physical, physiological, and psychological. Physical comfort provided by attractive and comfortable outdoor circulation systems (shady trees, seating, adequate walkway) and physiological comfort (lower vehicular noise and pollution) affords psychological comfort (general feeling of well-being), thus attracting a variety of activities. The various attributes which enhance the comfort on walkways are:

- Sidewalks of adequate width,
- Continuous sidewalks,
- Crossings,
- Curb-cuts,
- Surface design,
- Seating,
- Informal shopping – vending machines, show cases, books & grocery carts,
- Minor architectural features – public conveniences, traffic & police control booths, stands for bicycles & two-wheelers, sand bins, litter bins, road signs, sign boards, information boards / kiosks, area maps, advertisement boards, clocks, post boxes, telephone booths, flag poles, etc.,
- Recreational equipment – patterned tiles for board games, climbing equipment, roadside parks, spaces for traditional / folk performances,
- Lighting – decorative, flood lighting, illuminated signs, tree top lighting,
- Landscaping – trees, flower boxes, shrubs, potted plants, etc.,
• Fountains / water bodies – small water bodies, ornamental fountains,
• Art & Artifacts – sculpture, paintings, etc.

Fruin (1971) in Pedestrian Planning and Design emphasized the importance of seven criteria:
(i) Pedestrian safety by reduction of conflicts between pedestrians and vehicles
(ii) Security by providing clear line of sight, surveillance and good lighting levels
(iii) Continuity by removal of obstructions and barriers
(iv) Convenience by elimination of detours
(v) Comfort by Provision of grade-separated networks
(vi) System coherence by facilitating clear orientation
(vii) Attractiveness by means of aesthetics in urban design

According to Shelley (1976), pedestrian areas serve a framework of urban design, as a means of urbanity, as an instrument of town conservation, as leisure and play areas, and as elements of the residential environment. Main pedestrian streets should link the focal points of residential areas as well as the communal and commercial centers with the public transport systems and parking places. It should also include “pedestrian islands” such as squares, inner courtyards, forecourts and arcades.

The author stresses the importance of the following factors for a successful pedestrian network:
(i) Convenience: Pedestrian bridges and elevated sidewalks, pedestrian tunnels and concourses, pedestrian staircases and ramps.
(ii) Comfort: All-weather paths and inner squares, quality surface materials.
(iii) Quality of the urban environment: Consideration to be given to the architectural design, façade treatment and continuity of buildings bordering the pedestrian zone.
(iv) Security: Importance of pedestrian-oriented lighting.
(v) Amenities: Provision of shops, street furniture and landscaping.

Jacobs (1961) work emphasized the importance of the following issues in discussing streets for pedestrians:
(i) Safety: Clear demarcation of public and private space.
(ii) Security: Induce users by provision of shops and restaurants.
(iii) Width of the pedestrian sidewalk: Will induce activities on the sidewalks.
(iv) Visual image of streets
   - Avoid endlessness
   - Need visual interruptions
   - Should provide a hint of enclosure and entity
   - Diversity of use in buildings and spaces increases variety
   - Small blocks and frequent corners induce interest
(v) Comfort: provision of trees and awnings.

Kunstler’s (1994) Geography of Nowhere provides a scathing critique of vehicle-friendly streets. He says that the suburban American street was entirely designed for protecting the automobile driver. Trees were not located on the sides of the roads, as they might be the cause of collisions. The width of these roads was excessive, more than thirty six feet wide, for the speedy flow of traffic. There were no focal points or objects of interest, like statues or fountains, as these would cause inconvenience to vehicular traffic. Thus Kunstler indirectly indicates the importance of the following elements of a pedestrian-oriented street:
(i) Comfort: Provision of trees.
(ii) Safety: Provision of moderately wide to narrow carriageways to reduce speeding.
(iii) Visual image: Provision of focal points like statues, fountains and other elements which offer a visual sense of destination.

Richards in Future Transport (2001), states that, the quality of the walking environment is very important. He says that the success of large scale pedestrian areas, in cities such as Hamburg or Munich, depends partly on how animated they are by day and by night. Many authorities are encouraging housing to locate in the centre partly to reduce the transport problems as well as encouraging street life. According to him, pedestrian areas should ensure:

(i) Comfort: the provision of shops and restaurants, and the provision of other activities to induce street life.
(ii) Safety: the provision of safe crossings, and the reduction of vehicle speeds by traffic calming.

Allan Jacobs in Great Streets (1995) explains that the best streets are memorable; they help to create a sense of community and history, and provide a space for urban public life. His criteria combine experiential factors -- such as comfort and safety -- with the symbolic, ceremonial and political aspects of street life in the city. He discusses the qualities of great streets, including issues of architectural definition, transparency and complementarities of building types. He notes the importance of other elements - such as street trees, lighting and seating - in contributing to a sense of identity and comfort. The qualities of a good pedestrian environment have been classified as:

(i) Enclosure/definition.
(ii) Complexity of path network.
(iii) Building articulation.
(iv) Complexity of spaces.
(v) Transparency.
(vi) Buffer from vehicular traffic.
(vii) Shade trees.
(viii) Overhangs/awnings/varied roof lines.
(ix) Physical components/condition.

Cooper Marcus and others (1998) developed design recommendations for urban open spaces in People Places: Design Guidelines for Urban Open Space and identified the following features as critical to the success of a pedestrian space:

(i) Size and proportions.
(ii) Visual complexity.
(iii) Uses and activities.
(iv) Microclimate.
(v) Circulation.
(vi) Seating.
(vii) Landscaping.
(viii) Level changes.
(ix) Public art and sculpture.
(x) Paving.
(xi) Food kiosks.
(xii) Programs and special events.
(xiii) Street-vendors.
(xiv) Information and signs.
(xv) Accessibility.
(xvi) Maintenance and amenities.

Tibbalds (2001) in Making people-friendly towns states that the public realm is the most important part of towns and cities. It is where the greatest amount of human contact and interaction takes place. It is all the parts of the urban fabric to which the public have physical and visual access. Thus, it extends from the streets, parks and squares of a town or city into the buildings which enclose and line them. He says that the process of urban design needs to leave room for messiness and complexity. Accordingly some essential features of a people-friendly environment are:

(i) Pedestrian scale of design.
(ii) Individuality, uniqueness and the differences between places.
iii) Variety and complexity of uses and activities - culture, entertainment, leisure, recreation, civic life and the exchange of community views, ideas and opinions.

(iv) A pedestrian network consisting of streets, squares, public footpaths, parks and open spaces and extending also to riversides and seafronts.

(v) Accessibility of the pedestrian space to the young, the old and the infirm, as well as the able-bodied.

(vi) Quality of urban design - the interesting exploitation of different levels; mixed uses; residential zones in the town centre; consistency or unity of; clear definition of the centre, for example, by walls; and of entrances thereto by gateways or arches which also functionally may restrict certain types of vehicular penetration; a distinctive skyline; a very permeable structure of alleyways and passages; backcloth buildings of a consistent height against which special buildings are contrasted; changing views, gardens and courtyards visible to the public; sharing of private space; and, the predominance of the public space.

(vii) Safety
- By provision of mixed uses.
- Reduction of vehicle speeds by traffic calming.
- Provision of safe crossings.

(viii) Comfort
- By provision of street furniture and amenities.
- Protection from bad weather.

(ix) Permeability
- By encouraging pedestrians to move about in a variety of directions.

(x) Psychological comfort
- People find totally enclosed pedestrian environments and underpasses or bridges to be uncomfortable, disorienting and alienating. It is very important to keep people and activities at street level.

(xi) Convenience
- By facilitating physical and visual linkages.
- Provision of a barrier-free urban area.

(xii) Legibility
- By making it easy for people, as pedestrians or drivers, to understand where they are, how the town is arranged and which way to go for the different places, amenities and facilities that they require.

In another study, Moughtin (1992) dwells at length on the quality of the urban environment. According to him, human-scale is very important in the process of design. Some other significant issues identified by him are:

(i) Diversity of activities.
(ii) Creation of a “sense of place”.
(iii) Dimensions of the street: Length, width and proportion.
(iv) Quality of enclosure.
(v) Comfort: Protection from the weather.
(vi) Unified street design: The use of common materials, details and architectural elements, the imposition of a common roofline and the repetitive use of a constant plot width.

Design standards.

The configuration, shape and form of the street have not received the detailed consideration given to the design of the public square. So it is such a common practice to regard the street as a road or route for motor vehicles that its function as a place has been quite overlooked. For many generations the street has provided urban communities with public open
space right outside their homes. According to Jonathan Barnett (1982), streets provide an important framework for public open space planning. Yet, the modern city street has become, in some cases, a place of danger for citizens or so unattractive, for which it forces people to stay within the privacy of their homes and to move about in the relative sanctuary of the automobile. Even Christopher Alexander (1977) had this concern when he mentioned that streets should be for staying in, and not just for moving through, the way they are today.

Designing a street as a road for vehicles is not the same as designing it as a ‘path’. The traffic route designed by the engineer to serve so many passenger car units (PCUs) relegates the street to the level of a service conduit. This is far removed from Norberg-Schulz’s symbolic definition of a path. (Norberg-Schulz, 1971) Nor does a street conforming to traffic engineering standards necessarily fulfill Lynch’s requirements for a memorable path. (Lynch, 1960) Lynch’s path has a beginning and an end, definite places or nodes along its length, places of special use and activity; such paths can be scaled, have contrasting elements but above all, they must present to the observer a stimulating and memorable image of connected places. Thus street form, shape, length, proportion all contribute towards the creation of a sense of place. However the norms and standards of planning agencies in India continue to rely on the quantitative standards applicable to traffic.

**Standards for Pedestrian Facilities.**

Various standards have been propounded for a range of pedestrian facilities. The Time Saver Standards and the Neufert’s Standards put forth standards ranging from the average dimensions of a human being, the space required for a person to walk, strolling, and waiting in a queue, space requirements with umbrellas and luggage to a group of people standing close together. Time saver standards also give accessibility criteria for various destinations from the dwelling unit, in terms of maximum walking distance.

![Figure 1: Time Saver Standards - Pedestrian facilities (Chiara and Crosbie, 2001)](image)

No comprehensive standards developed for the Indian context, especially in metropolitan cities as far as accessibility criteria and pedestrian spacing is concerned. Architect B.V.Doshi in the award winning project “Aranya”, a housing project at Indore, had developed ‘Levels of Accessibility’ scale for various facilities.

![Figure 2: Aranya-Level of Accessibility Source: Vastu Shilpa Foundation 1990](image)
Edward Hall (1990) in "The Hidden Dimension" elaborated on standards for typical pedestrian spacing, at different situations.

Robert Sommer in "Personal Space" developed standards for human personal space and crowds. (Sommer, 1969)

Figure 5: Spacing for different activities
Source: Hall (1990) "The Hidden Dimension"

Figure 6: Personal Space
Source: Sommer (1969)
The Indian Roads Congress (IRC) has stipulated standards for pedestrian facilities like sidewalks, guard rails and pedestrian crossings -- both at-grade and grade-separated. (IRC, 1998) But these lack the "human" element like aesthetics, scale, form and proportion. Pedestrian amenities and street furniture do not find a place in these standards. Context-specific standards according to the location in the city, hierarchy of streets and functions of streets have not been thought of. There have been no comprehensive standards developed for the Indian context especially in metropolitan cities as far as accessibility criteria and pedestrian spaces is concerned. The IRC guidelines for pedestrian facilities provides details of sidewalks, guard-rails and crossings -- at-grade and grade-separated.

There are numerous works dealing with standards and guidelines for pedestrian facilities in the western world. In the United Kingdom, the Institution of Highways and Transportation has developed guidelines for journeys by foot (IHT, 2000). This self guidance lists out the design standards and guidance for footways, crossings and other infrastructure items which have a bearing on walking. The IHT states that the detailed design process is vital to the successful delivery of facilities for walking. The guidelines lay down the standards for footway design, ramps and steps, kerbs, guard rails, signage, tactile surfaces, crossing facilities -- at-grade and grade-separated, surface treatments, surface drainage, trees and landscaping, street furniture and street lighting.

The U.S. Department of Transportation has published a comprehensive pedestrian facilities user guide which provides information regarding walkable environments and improvements for pedestrians. It gives guidelines for sidewalks, buffer zones, curb ramps, crosswalks, bus stops, lighting, overpasses and underpasses, street furniture, roadway design and intersection design. It also talks about traffic calming, traffic management, signals and other measures (Federal Highway Administration, U.S. DOT, 2002).

The Department of Transportation, State of Florida, U.S.A., has brought out 'A Manual of uniform, minimum standards for design, construction and maintenance of streets and highways', commonly known as the 'Florida Greenbook'. It's purpose is to provide uniform minimum standards and criteria for the design, construction, and maintenance of all public streets, roads, highways, bridges, sidewalks, curbs and curb ramps, crosswalks (where feasible), bicycle facilities, underpasses, and overpasses used by the public for vehicular and pedestrian traffic.

The U.S. Highway Capacity Manual attempts to make 'walking' an equal mode among all transport modes, but it does so only on its terms of service measures. The HCM defines 'Level of Service' (LoS) as:

'a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience'
(Transportation Research Board, 2000, p. 5-8).

This definition of level of service applies to all transportation modes, motorized or non-motorized. Walking is treated as a variation of motorized traffic, the transportation modes being separated only by space and time. The qualitative measures of pedestrian flow are similar to those used for vehicular flow, such as the freedom to choose
desired speeds and to bypass others (p11).

The LoS system is remarkable for its lack of relevance to the personal experience of walking. LoS is based on chronological time. The quality of walking is, however, determined to large degree by psychological or perceived time. For instance, a lively and vibrant sidewalk tends to make slow speeds, acceptable, even enjoyable. But, according to the HCM methodology - a high crime area, where pedestrians are hardly seen for obvious reasons, provides good LoS.

Thus, a pedestrian facility provides a high LoS if few pedestrians are present, and the best possible pedestrian LoS is achieved with one pedestrian present, or none! A logical conclusion then is that, pedestrian LoS can be operationally defined as freedom to manoeuvre. This pedestrian perspective is unsettling and grotesque, however, when we want to understand and improve the pedestrian realm from a social, cultural and economic point of view.

The pedestrian environment in an institutional zone in Chennai

This case study is part of a research undertaken by the author on Pedestrian Spaces in urban areas. Stretches of streets in Chennai where pedestrian traffic is significant were identified and a qualitative evaluation was conducted. A wide variety of streets were taken up for study — Commercial, Residential, Institutional, Recreational, etc.

This paper presents the case study of an institutional zone in Guindy in southern Chennai. Sardar Patel road is the arterial road which serves as the access to all the institutions. On one side it is bounded by the campuses of Anna University and Central Leather Research Institute (CLRI) while on the other side are the Indian Institute of Technology, (IIT) Madras campus, the Cancer Research Institute, the Children's Park and a multitude of memorials in homage to Mahatma Gandhi and other prominent Indian statesmen, culminating in the sprawling Raj Bhavan, serving as the Governor's residence.

Figure 7: The southern peninsula of India showing the location of Chennai

Figure 8: Detailed layout of the study area in Chennai

Figure 9: A Sketch map of the study location
The area sees a huge influx of students, faculty and tourists. But sadly there is no consideration for the pedestrian. Pedestrian amenities are virtually non-existent. There are no resting places, coherent signage system, and unified design language adopted for street furniture, play equipment, landscaping or works of art. The sidewalks are maintained well due to the proximity of the Raj Bhavan. But, the recent addition of a vehicular flyover has resulted in the pedestrian sidewalk becoming the prime casualty. At one stretch, the sidewalk is barely wide enough for an individual to walk. Earlier the stretch abutting the memorials boasted of a cycle track. But this was assimilated into the vehicular carriageway as a consequence of the flyover, due to paucity of space on both sides of the flyover.

The stretch of sidewalk abutting the memorials were encroached by street venders whose main clientele were the tourists and the students. Pedestrians weren’t affected much because they could walk freely on the cycle track which was wide enough to accommodate them and cyclists. The area was vibrant during lunch time and evenings when students descended in droves to relax over a cup of tea and snacks. The vendors could be found catering to students till late into the night usually till 12 or 1 am.

All this was lost with the construction of the flyover and the ‘cleansing’ of the sidewalk of the vendors by the city corporation. Overnight, the area acquired a sterile appearance with the loss of people in the sidewalk. Thus, a qualitative assessment was needed to highlight various environmental factors that can greatly influence the
pedestrians’ perceptions of the overall quality of the street environment.

These factors are analyzed in finer detail and an evaluation and grading method devised to assess the street.

Method of Study

An evaluation of the stretch was conducted against checklists of preferred qualities / characteristics. A simple ratings scale was used. A scale of 1 to 5 was deemed sufficient to accurately cover the range of performance: 5 = excellent; 4 = good; 3 = average; 2 = poor; 1 = very poor.

Parameters of facilities and amenities (Sarkar, 2002)

- Sidewalks of adequate width,
- Continuous sidewalks,
- Crossings,
- Curb-cuts,
- Surface design,
- Seating,
- Informal shopping — vending machines, show cases, books & grocery carts,
- Minor architectural features — public conveniences, traffic & police control booths, stands for bicycles & two-wheelers, sand bins, litter bins, road signs, sign boards, information boards / kiosks, area maps, advertisement boards, clocks, post boxes, telephone booths, flag poles, etc.,
- Recreational equipment — patterned tiles for board games, climbing equipment, roadside parks, spaces for traditional / folk performances,
- Lighting — decorative, flood lighting, illuminated signs, tree top lighting,
- Landscaping — trees, flower boxes, shrubs, potted plants, etc.,
- Fountains / water bodies — small water bodies, ornamental fountains,
- Art & Artifacts — sculpture, paintings, etc.

Parameters of qualities (Jacobs, 1993)

- Enclosure/definition,
- Complexity of path network,
- Building articulation,
- Complexity of spaces,
- Transparency,
- Buffer,
- Shade trees,
- Overhangs/awnings/varied roof lines, and
- Physical components/condition.

Evaluation

The evaluation was carried out after a visual observation of the study area with the support of the senior students of Architecture, Sathyabama University, Chennai. Each parameter of the checklists was rated according to the scale adopted. There is an element of subjectivity involved in this aspect of the endeavour in that different people rate a parameter differently. However, this subjectivity was greatly countered by having two teams of students that rated the same stretch and the mean rating was obtained.

Findings of the study:
Stretch abutting Anna University

Pedestrian amenity:

Sidewalks of adequate width was rated at 2. Along smaller part of the stretch, the sidewalk is very wide (1.5 to 1.8 metres) but along major parts of the stretch, the sidewalk is narrowed to only 0.5 to 0.6 metres wide in order to accommodate a vehicular overpass. This is a gross violation of the guideline of the Indian Roads Congress which indicate the sidewalks need to be at least 1.5 metres. Considering the fact that large numbers of students use the sidewalks, the width should be more than 1.5 metres.

Continuous sidewalks got a rating of 3. The sidewalks are continuous for most
parts except for the entrance area of the campus. This is advantageous for pedestrian comfort and convenience. Crossings got a rating of 1. There is just one crossing for pedestrians but there are no markings on the road surface. This again is a violation of the IRC guidelines. A distinct crossing pattern or a stop-line for vehicles would have aided the cause of pedestrians.

Availability of curb-cuts, surface design, seating and informal shopping were rated 0. There are no curb-cuts thus putting the physically challenged and infants at a disadvantage. In fact, the height of the sidewalk is at some points more than one foot thus causing great difficulty to the vulnerable pedestrian – the children, elderly and the handicapped. There has been no effort taken for distinct surface design such as patterns to aid the visually challenged. No seating provided even though adequate width of sidewalk exists in some areas. Seating could encourage more pedestrians to utilize the sidewalk. This could also benefit informal shops. Informal shopping does not exist. Earlier vendors used to throng the sidewalk. They could be integrated into the pedestrian environment without hampering the free movement of people.

Minor architectural features and recreational equipment got rating of ‘0’ as no efforts taken to design the sidewalk and its elements. This renders the environment monotonous and reduces the inclination of people to walk. Recreational equipments however, is not relevant to the stretch as children do not form part of the pedestrian population on this stretch. Lighting was rated 1. Lighting exists but it is oriented towards the vehicular part of the road. Lights are not designed keeping the pedestrian in mind. Pedestrian lights would help in aiding the feeling of security at night. This would encourage more students to utilize the sidewalks after dark and aid the informal shopping sector also.

Landscaping got 0 as no efforts taken to landscape the sidewalk but the presence of large trees within the university campus adequately shade the pedestrian. The campus trees help in keeping the sidewalk shaded. Works of art would go a long way in personalizing the sidewalk. Maybe the help of students could be enlisted in producing art works.

**Quality attributes:**

Enclosure/definition was rated with 2, perhaps because the buildings do not provide any feeling of enclosure as they are set back at a considerable distance from the sidewalk. However, the row of trees which line the compound wall abutting the sidewalk create a definition for the stretch. Complexity of path network was rated with 1. The sidewalk, being part of a prominent vehicular road, complexity of the path is minimal. But complexity even at the smallest level would go a long way in increasing the interest quotient of the sidewalk.

Building articulation and the complexity of spaces got ratings of 1 as the buildings are set back at a considerable distance from the road so there is no realization of building articulation. This usually cannot be avoided in a campus. But it leads to a complete isolation from the built environment. So the opportunity to interact with the architectural environment is lost and the Complexity of spaces is also minimal.

Transparency was rated with 2. The landscape bordering the sidewalk affords plenty of views into the campus so there is a certain degree of transparency. Buffer got ‘0’ as the vehicular carriageway abuts the sidewalk. Where the sidewalk has been reduced to 0.5 metres due to the vehicular overpass, the
pedestrian is usually forced to step down to the vehicular right-of-way, thus paving the way for conflicts. Earlier there used to be a buffer between the sidewalk and the vehicular carriageway in the form of a cycle track. But this was the first casualty of the vehicular flyover.

By contrast, shade of trees rated high with 5 as old and large-canopy trees line the compound wall abutting the sidewalk thus providing shelter to the pedestrian from the sweltering Chennai sun. Microclimate is a significant factor in Chennai’s pedestrian environment as the harsh Sun discourages people from walking. The buildings are set back at a considerable distance from the road so there is no realization of a surrounding architectural environment. This leads to a total lack of interaction with the built environment, which otherwise could have provided the pedestrian the desired qualities of interest and diversity. This was clear with the overhangs/awnings/ a varied roof line was given a rating of 0. But the physical components/condition was rated high at 4 as the existing physical components of the sidewalks, compound walls and entrance gates are maintained in a good condition. This helps in enhancing the feeling of comfort and convenience experienced by the pedestrian.

**Stretch abutting Gandhi Mandapam**

**Pedestrian amenity:**

In this stretch both the sidewalk width and continuity were given a rating of 3. Compared to the opposite stretch abutting Anna University campus, the width of the sidewalk is more consistent. It is 1.5 metres wide except for the stretch abutting the vehicular overpass, where it shrinks to a mere 0.5 metres. The large number of tourists thronging this side of the stretch are reason enough to increase the width beyond the IRC stipulated width. The sidewalks are continuous for most parts except for the entrances of the various memorials of national leaders. Even at the entrances of these memorials, continuous sidewalks could have been provided as vehicular entry is banned into these memorials. The crossings got a rating of 1, because there is just one crossing for pedestrians in front of Anna University but there are no markings on the road surface. The large numbers of tourists reaching this spot by buses cross over at random places, due to the absence of a defined crossing indication. Similar to the previous stretch, the curb-cuts, surface design and seating were rated 0, There are no curb-cuts. There is no distinct surface design. No seating provided even though adequate width of sidewalk exists in some areas. Seating facilities could assist the tired tourist and encourage informal shops which do not exist in this stretch. But scope exists due to the presence of a sizable tourist and student population. Shops did exist till about 15 years back but were unfortunately considered an eyesore and an impediment to pedestrians and removed.

Minor architectural features were given a rating of 1, as the sidewalk and its elements are not effortful designs. A valuable opportunity is lost in creating interest for the sizeable tourist pedestrian population. Lights are not designed keeping the pedestrian in mind, but the lights of the adjacent memorials provide some light and therefore got a rating of 2. Landscaping, fountains or water bodies, art & artifacts got 0 rating as they do not exist. They could have been employed in the design of the sidewalk to provide interest in the pedestrian environment and also to mitigate the harsh Chennai sun. Artwork could have reduced the monotony of the stretch.

**Quality attributes:**

Enclosure/definition got a moderate rating of 2 in this stretch too. Similar to the other stretch the buildings are set
back at a considerable distance from the sidewalk, but the rows of trees at compound wall create a definition for the stretch. Complexity of both the path network and places and building articulation, got 1 as the sidewalk was just another part of a prominent vehicular road. Ratings similar to the previous case were seen in Transparency, buffer, shade trees, overhang/awnings/varied roof lines and Physical components/condition.

Discussion and Conclusion

Pedestrian spaces are vanishing from many of the urban areas in India, due to the rapid pace of increase in vehicular traffic. This leaves them all the poorer in comparison to the attractive, intricate places of older settlements, which were principally designed in accordance with the scale of pedestrians and not motorists. With a large number of trips being performed on foot, the focus of planners and designers is returning to the design of the public realm as an organic, complex, human-scale and attractive environment.

This study has been carried out primarily to assess the problems afflicting pedestrian environments. The first step is to evolve a suitable method of evaluating pedestrian spaces. Most of the existing techniques approach pedestrians as just another mode of traffic, with the sidewalk being assessed solely in its capacity to allow free movement. But, pedestrians indulge in diverse activities apart from walking, such as chatting, window-shopping, resting, etc. A pedestrian can be a child, a teenager, a young man or woman, a middle-aged person, an elderly person as well as a physically challenged person. Therefore, equalizing them all as just pedestrians is not appropriate.

From the literature review, the attributes of a conducive pedestrian environment were identified. These were characterized as parameters of amenities and parameters of qualities. The evaluation of pedestrian amenities and the overall pedestrian environment reveals serious shortcomings across a wide variety of issues. Many of the parameters used for evaluation got a rating of 0 or 1 implying that the quality of the environment was felt ‘highly unsatisfactory’.

The shortcomings noted in the two locations could be easily avoided, as except for some stretches of the sidewalk, adequate width exists. The student population would be encouraged to frequent the stretch again by the provision of seating and informal vending facilities. Tourists visiting the Children’s Park and the memorials would also benefit from the addition of vendors and resting places.

The parameters set for this evaluation are significantly different from the standard traffic engineer’s methodology where pedestrian facilities are appraised solely on the basis of standards such as the sidewalk capacity, pedestrian volume, pedestrian flow and other parameters adapted from vehicle traffic evaluation characteristics.

Further steps in this evaluation would involve a survey of pedestrians to gauge their likes, dislikes and priorities and a review of the immediate architectural environment to determine its’ effect on the pedestrian. Specific elements of the pedestrian environment could then be looked at and reworked according to the context. The method adopted in this study provided possibility for a comprehensive analysis of the stretch under consideration. The analysis enables to identify precise action to be taken to rectify the identified drawbacks. The method can be used also to analyze
streets of diverse uses. There is a scope for subjective interpretation during the evaluation process as some parameters, particularly the characteristics of the urban environment, are subjective. Yet, the study validates the rationale of evaluating pedestrian spaces on the basis of qualitative parameters, and strongly recommends the efficacy of a qualitative evaluation as a reliable and effective technique for evaluating pedestrian environments. The application of the method on selected stretches of streets in Chennai reveals a lot of shortcomings in the pedestrian realm, many of which would not have been brought out with quantitative techniques. This reinforces the fact that a qualitative evaluation would serve as the ideal tool for appraising pedestrian environments.

References:

Appleyard, D 1981, Livable Streets, University of California, Berkeley.


Burden, Dan 1996, Walkable and Bicycle-Friendly Communities, Florida Dept. of Transportation.


Institute of Road Transport 1990, Pedestrian Safety in Madras City, Chennai.


Sarkar, S 1993, *Determination of Service Levels for pedestrians*, with European examples, *Transportation Research Record 1405*.

Sarkar, S 1995 ‘Macro level and micro level evaluation of pedestrian networks’,

*S* *Transportation Research Record 1502*, 105-118.


Vastu Shilpa Foundation 1990, Aranya, Vastu Shilpa Foundation, Ahmadabad, India.