

Assessing the Needs of Pedestrian Facilities at Tiruchirappalli, India

Menilai Keperluan Kemudahan Pejalan Kaki di Tiruchirappalli, India

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ABSTRACT

Walking is an inherent part of journeys of majority of people living in Indian cities. Walking has many advantages ranging from individual's health to environmental issues. Although significant number of trips is made on foot the current practices of municipal administrations underestimate the importance of walking. The urban streets and roads have been designed taking into consideration the requirements of vehicular growth and neglecting the requirements of pedestrians. In most of Indian cities the pedestrian facilities are either inadequate or non-existent. This study investigated the present state of pedestrian facilities and assessed the needs of pedestrians on the main streets of various land use zones in Tiruchirappalli City, Tamil Nadu state, India. Field studies were carried out using survey tool kits that include Global Walkability Index (GWI) developed by Holly Virginia Krambeck, Pedestrian infrastructure observation sheet and Pedestrian preference questionnaire. The walkability indices of streets in mixed residential zones were maximum and walkability indices of streets in residential zones were minimum. In the surveyed streets the sidewalks are either inadequate or not present. The existing pedestrian paths are mainly encroached by street vendors and parking of vehicles. The pedestrian facilities along the pedestrian paths are almost non-existent. The most important concerns of pedestrians include issues such as personal security, inadequate street lighting, encroachment on pedestrian platforms, lack of well connected and well maintained pavements. Based on the observations of existing pedestrian facilities and assessment of pedestrian needs this paper proposes pedestrian-focused solutions to improve walkability.

Keywords: Walking; pedestrian; walkability index; pedestrian infrastructure; pedestrian needs

ABSTRAK

Berjalan adalah satu kemestian yang wujud dalam perjalanan kehidupan penduduk yang tinggal di bandar-bandar di India. Berjalan kaki mempunyai banyak kelebihan dari kesihatan individu dengan isu-isu alam sekitar. Walaupun sebilangan besar perjalanan dibuat dengan berjalan kaki amalan semasa pentadbiran perbandaran meremehkan pentingnya berjalan. Jalan-jalan bandar dan jalan raya telah direka dengan mengambil kira keperluan pertumbuhan kenderaan dan mengabaikan keperluan pejalan kaki. Dalam kebanyakan bandar-bandar di India kemudahan pejalan kaki adalah sama ada tidak mencukupi atau tidak wujud. Kajian ini menyiasat keadaan semasa berkenaan dengan kemudahan pejalan kaki dan menilai keperluan pejalan kaki di jalan-jalan utama pelbagai zon guna tanah di Tiruchirappalli Bandar, Tamil Nadu, India. Kajian lapangan telah dijalankan dengan menggunakan kit alat kaji selidik yang merangkumi Indeks Walkability Global (GWI) yang dibangunkan oleh Holly Virginia Krambeck, pejalan kaki infrastruktur pemerhatian dan soal selidik lembaran keutamaan pejalan kaki. Indeks walkability jalan-jalan di zon kediaman bercampur adalah maksimum dan indeks walkability jalan-jalan di zon kediaman adalah minimum. Di jalan-jalan yang dikaji, kaki lima adalah sama ada tidak mencukupi atau tidak hadir. Laluan pejalan kaki yang sedia ada kebanyakannya dicerobohi oleh penjual jalanan dan kenderaan yang diletakkan di situ. Kemudahan pejalan kaki di sepanjang laluan pejalan kaki yang hampir tidak wujud. Kebimbangan paling penting pejalan kaki termasuk isu-isu seperti keselamatan peribadi, lampu jalan yang tidak mencukupi, pencerobohan ke atas platform pejalan kaki, kekurangan kaki lima juga hubungan dan di selenggara dengan baik. Berdasarkan pemerhatian kemudahan pejalan kaki dan penilaian keperluan pejalan kaki yang sedia ada, kertas kerja ini mencadangkan penyelesaian pejalan kaki yang memberi tumpuan untuk meningkatkan daya tahan pejalan kaki.

Kata kunci: Berjalan kaki; pejalan kaki; indeks walkability; infrastruktur pejalan kaki; keperluan pejalan kaki

INTRODUCTION

In Indian cities walking is the major form movement for a large percentage of people, especially the poor who often do not have other alternatives. Though

the ownership of private vehicles is increased enormously still large percentage of people depend on public transportation for their daily trips. Walking also supports the public transport facilities, improving the overall livability of cities, providing accessibility

within built areas, and providing an alternative to private vehicles for short-distance trips. Walking has many advantages such as less traffic congestion on streets, less pollution and on physical well being of people. As walking is an integral part of whole transportation system, appropriate and adequate pedestrian infrastructure need to be created in urban streets for the comfort and convenience of existing pedestrians and to increase the pedestrian volume. The pedestrian infrastructure also influences the outsiders' perception of image of the city.

The basic criteria that encourage walking include comfort, safety and enjoyment of walking. The criteria for pedestrian friendly streets include accessibility and permeability, safety, comfort for pedestrians, street elements and furniture and maintenance aspects. According to Hung et al. (2010) wider foot paths, clean sidewalks without obstacles and more crossing points are the most desirables to improve walkability. Previous researchers have pointed out that high quality sidewalks encourage residents to walk more and other factors that encourage walking include access to desired destinations, pleasant pathways and safety of people (Brown, B. B. et al. 2007).

Walkability is the term used to measure the connectivity and quality of footpaths provided on city streets for pedestrians. Transport for London (2004) defines walkability as "the extent to which walking is readily available to the consumer as a safe, connected, accessible and pleasant activity." In India, the walkability index used by the Ministry of Urban Development (MOUD) was a function of the availability of footpaths and rating of pedestrian facilities (Government of India MOUD 2008). The Global Walkability Index (GWI), as developed by H. Krambeck for the World Bank, provides a qualitative analysis of walking conditions. The factors considered include walking path modal conflict, security from crime, crossing safety, motorist behavior, pedestrian amenities, maintenance and cleanliness, disability infrastructure, obstructions, availability of crossings and others. The Global Walkability Index (GWI), as developed by H. Krambeck for the World Bank is adopted for the current walkability of Asian cities and to identify ways to improve pedestrian facilities.

While the walking mode share is still high, it is declining across Indian cities mainly due to deterioration of pedestrian environment as the authorities concentrate more on developing infrastructure for vehicular traffic to accommodate ever increasing volume of vehicle traffic at the cost of pedestrian facilities. The existing pedestrians

platforms are either totally removed or reduced in width to increase the capacity for motorized vehicles. Hence this study focuses on the level of pedestrian infrastructure provided, pedestrians opinion about the shortcomings in the present pedestrian infrastructure and also the preferences of pedestrians for safe and comfortable walking on urban streets.

METHOD

The Walkability Survey comprising of subjective assessment of availability and features of pedestrian infrastructure and pedestrian interview surveys were conducted in Tiruchirappalli, the fourth largest city in Tamil Nadu state, India. Based on reconnaissance survey ten streets were selected, two streets each from various land use zones, namely residential zone, commercial zone, around public transportation terminals, pilgrimage/ tourism areas and mixed use zones. The streets with heavy pedestrian traffic were considered for the selection.

The methodology used in this study is based on the Global Walkability Index (GWI), as developed by H. Krambeck for the World Bank. This method provides a qualitative analysis of walking conditions including the safety, security, and convenience of the pedestrian environment. The streets were surveyed using the parameters in the GWI, namely Walking Path Modal Conflict, Security from Crime, Crossing Safety, Motorist behavior, Pedestrian Amenities, Maintenance and Cleanliness, Disability Infrastructure, Obstructions, Availability of Crossings and others. Field survey was carried out by trained under-graduate students of architecture by visiting the streets both during day time and night times. The students were asked to rate each parameter of the selected road stretches on a 5-point scale, 1 being the lowest and 5 the highest.

In this study, features such as availability of raised pedestrian platforms, their width and height, nature and maintenance of pedestrian platforms, provision of street furniture, obstructions and parking of vehicles on platforms, shading, and night time lighting in various selected streets were recorded by two trained under-graduate students of architecture by visiting the streets both during day time and night times.

A questionnaire on the personal and travel characteristics as well as the preferences of the respondents was prepared. The questionnaire survey was carried out during both day and night times and

the questionnaire was filled out by a surveyor while interviewing pedestrians.

FINDINGS AND DISCUSSION

WALKABILITY INDEX

The walkability ratings of different zones/areas of the city were derived by taking the average of the

individual parameters' averages. The number of people walking (pedestrian count) during the time of the survey and the length of the stretch being surveyed were not considered for the calculation of walkability index as followed in other studies carried out in India and other Asian cities (Abha Sadana and Deepa Bhaskaran 2012). The calculated walkability index for each of the zone is given in Table 1.

TABLE 1. Walkability index for different land use zones

Land use Zone	Around				
	Residential Zone	Commercial Zone	Transportation	Pilgrimage/ Tourism Areas	Mixed Use Zone
Walkability Index	35.0	46.0	54.0	53.0	55.0

The walkability index of streets in mixed use (residential) zone was maximum and the walkability index of streets in residential zone was minimum. The walkability index of streets in residential zone was minimum mainly due to non availability of raised pedestrian platforms in residential streets. It was noted that the minor variations in the characteristic features of pedestrian platforms and facilities of streets in various zones is the reason for similar walkability indices of other zones.

ASSESSMENT OF PEDESTRIAN INFRASTRUCTURE

Based on the physical assessment by trained students the characteristic features of pedestrian infrastructure provided in streets of different land use were established. Raised pedestrian platforms are not provided in residential streets, whereas raised platforms are provided in the streets of all other land use zones. The width of the platform is 1m in the streets around transportation terminals and pilgrimage/ tourism area, 1.5 to 2m in commercial and mixed use zones. The platforms raised by 25 to 30cm from vehicular road surface. In all land use zones the pedestrian platforms are non- continuous with unclean and uneven surface. The pedestrian platforms in all zones are partially or fully occupied by the adjoining building owners and also used for parking of vehicles. In all land use zones, seating for pedestrians and other street furniture are not provided. It is evident that pedestrian infrastructure present in the streets of various land use zones of Tiruchirappalli are not adequate.

PEDESTRIAN INTERVIEW SURVEYS

The survey was carried out both during day and night hours and the total sample consisted of 167 people. The sample consisted of 101 male and 66 female; and 69 people in the range of 41- 60 years of age, 70 people in the range of 21-40 years of age, and 27 people below 20 years of age. When pedestrians were asked to list the most important concern while walking urban streets, 51 people mentioned lack of well maintained pavements, 45 mentioned personal security threats, 28 mentioned lack of well connected pavements and 62 people mentioned all the above mentioned factors. It is apparent that pedestrians prefer well connected and maintained pathways and also measures to increase their personal security while walking on streets.

People mentioned poorly maintained footpaths (94 persons), obstructions on pedestrian paths(83 persons), unruly behavior of motorists(85 persons), narrow foot paths(51 persons), inadequate lighting(62 persons), open manholes/pits (31 persons) are major factors for their unsafe feeling while walking on the streets. Large percentage of pedestrians mentioned zebra crossings (32%) is the convenient facility to cross the road. 26% of pedestrians mentioned foot over bridges, 18% mentioned subways, 13% mentioned pedestrian symbol on traffic lights, 6% mentioned push button for pedestrian signals and 5% mentioned other means as the convenient facility to cross the road (refer Figure 1).

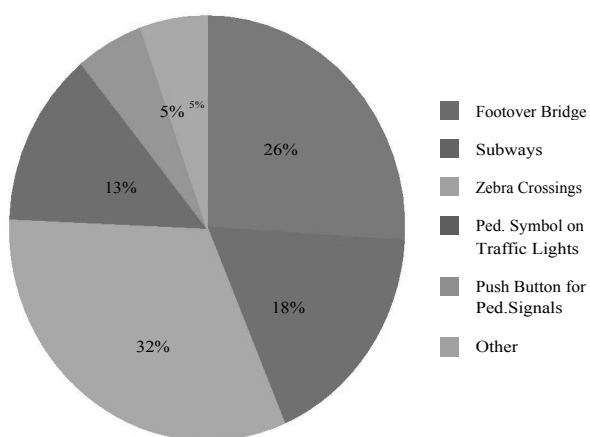


FIGURE 1. Convenient facility for pedestrians to cross the roads

Pedestrians suggested improvements such as wider, cleaner and continuous pedestrian paths, footpaths free from garbage, removal of hawkers on footpaths, controlling the parking of vehicles on foot paths, good lighting during night hours and shading during day time, division between footpaths and vehicular roads, limiting speed of vehicles and zebra crossings with speed breakers for vehicles at regular intervals for road crossing for their safe and comfortable walking.

CONCLUSION

This study pointed out the shortcomings in the existing pedestrian infrastructure and also established the preferences of pedestrians for safe and comfortable walking. It is evident that concerns about personal security also an important factor in addition to good quality infrastructure for pedestrians. Provision of raised and segregated continuous and well maintained pathways is needed in all streets of various land use zones. The pedestrian platforms need to be designed with adequate width for people to move comfortably and raised adequately from the vehicular road surface for the safety of pedestrians. Pedestrian platforms shall have non-slippery even

surface finish and free from pits and open manholes. It is also evident from the assessment of pedestrian infrastructure and pedestrian interview surveys that efforts are required to keep the pedestrian platforms free from any physical obstructions, encroachment by shop keepers and parking of motorized vehicles. Appropriate independent lighting need to be designed for pedestrians along with street lighting for vehicular traffic as the lighting requirements pedestrian and vehicular traffic are quite different. This study also established that the zebra crossings are the most preferred facility for crossing the vehicular roads. Though this study broadly established state and needs of pedestrian facilities, larger study on this subject is being carried out to arrive at comprehensive guidelines for development of pedestrian facilities in Tiruchirappalli.

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