



Human Ellipse of Indian Pedestrians

Natasha Singh^{1*}, Purnima Parida², Mukti Advani² and Rajesh Gujar³

¹*Metro-Link Express for Gandhinagar and Ahmedabad (MEGA) Pvt. Ltd, Ahmedabad, Gujarat*

²*CSIR- Central Road Research Institute, New Delhi.*

³*Pandit Deendayal Petroleum University, Gandhinagar, Gujarat.*

natasha30192@gmail.com, punam31@gmail.com, mukti7@gmail.com,

rajesh.gujar@sot.pdpu.ac.in

Abstract

The most important parameter for designing a pedestrian facility is the area required by a pedestrian to stand comfortably or make a comfortable movement. This area is referred as Body Ellipse (Human Ellipse) and depends on Shoulder Width and Body Depth of a human being (and also on the kind of activity i.e. Standing or Walking). In current practices, design of pedestrian facilities' are according to the body ellipse of pedestrians experimented in The United States Of America (US-HCM 2010). Regional variances are marked in these physical characteristics that are dependent on human body dimensions to a greater extent, ultimately playing an important role in pedestrian's convenience (capacity and Level of service of a facility) and design environment. This paper is an attempt to study the measurements of Body Ellipses i.e. body depth and shoulder width by carrying out videography surveys on the pedestrians in India (specifically Delhi). The analysis also includes, classifying the body dimensions according to gender and walking with/without baggage (handbag/backpack), along with the measurement of the Step length of pedestrians' while walking which shall give out the area required for walking. These body dimensions have been compared with the standard body dimension available worldwide. The study location was a walkway in a commercial area in Delhi (India) with a sample size of 747 consisting of 132 females and 615 males. The extracted body dimension varies from 26.07 to 52.14 centimeter for body depth and 42.35 to 67.76 centimeters for shoulder width.

Keywords: Pedestrians, Human Ellipse, India

1 Introduction

Everyone walks. Being able to walk is one of the most magnificent abilities of a human being, and is an important step for the progress towards civilization. Planning and implementing pedestrian facilities require an understanding of the characteristics of pedestrian movements, such as their Speed, Flow, Space requirements, Shy Distance from obstacles, tolerance to congestion etc.

* Corresponding author

The most quoted and referred capacity manual in the transportation community worldwide is the United States- Highway Capacity Manual (US-HCM) first developed in 1950. The Indian traffic characteristics are fundamentally different from those in the developed countries and even the driver behavior is vastly different from even the developing economies like China and Indonesia. Consequently, the development of Indian Highway Capacity Manual (Indo-HCM) has been undertaken on priority in the form of a mission mode project by considering the various categories of Indian roads like Expressways, National Highways (NH), State Highways (SH), Major District (Country) Road (MDR), Other District Roads (ODR) and Urban Roads (UR) separately.

In Current practices, the space requirements by a pedestrian (Body Ellipse of United States (US) pedestrians) given in US-HCM 2010 are used for developing LOS criteria while designing a pedestrian facility. The body dimensions of pedestrians' vary according to the regions. It has been observed that western people are generally taller and have broader shoulders as compared to Asians. This may induce a change in the capacity of a pedestrian facility. This paper deals with the space requirements of a pedestrian on a walkway facility. The space requirements (Human Ellipse) of US pedestrians may be different from that of Indian pedestrians, given the socio-cultural differences. This change ultimately has an impact on developing the capacity values of a pedestrian facility. The present study is an endeavor to understand the actual space requirements of the pedestrians in India.

2 Need & Scope of the study

In reference to the pedestrian facilities design and analysis, the US-HCM, provides a general framework and procedures. However, different locations have their own physical restraints as well as individual environmental requirements, and may require the application of different qualitative and quantitative standards. Furthermore, the criteria adopted for Western countries may not be appropriate for Asian countries because of different pedestrian characteristics (Tanaboriboon and Guyano, 1989). It has been studied through primary literature survey that information regarding Human Ellipse (pedestrian space) for Indian scenario is very limited (Rakesh and Mohamed, 2010) and hence, it has been proposed to be studied. The scope of this study is limited to Pedestrians walking on sidewalks and walkways in Delhi, India.

3 Research Methodology

The research begins with an extensive literature review related to the works in the pedestrian domain, mainly in the Human Ellipse. Various manuals, research papers, books etc. were referred. Based on the existing literature, it has been understood that very negligible numbers of studies have been done in regard of focused topics for Indian scenario. Based on this gap in literature, objectives and scope of present study has been defined. Geographical scope of the study was limited to Delhi only. Delhi being the National Capital has a cosmopolitan character and Indians from all over the country live for employment and education purpose. Also Delhi attracts lots of tourist from various parts of India as well as abroad. An attempt was made to select a site where people of varying ages and all walks of life and place, and purpose can be captured through videographic surveys.

Videography data collection was done at various sites spatially distributed in Delhi for collecting pedestrian data related to the study. Videography surveys were done to collect Human Body Dimensions. The Human Ellipse part of the study requires extraction of Shoulder width and Body depth, and hence data collection is from a camera located at a height with lens facing down.

Observed pedestrians have been categorized into pedestrians based on gender (Male and Female) and classified further walking with baggage, without baggage. The 95th percentile values for the human dimensions and shy away distance have been then summarized. The lateral distance

Download English Version:

<https://daneshyari.com/en/article/1106104>

Download Persian Version:

<https://daneshyari.com/article/1106104>

[Daneshyari.com](https://daneshyari.com)