

# **PEDESTRIAN WALKING SPEED DATA ANALYSIS**

**A Project and Thesis submitted in partial fulfillment of the requirements  
for the award of Degree of  
Bachelor of Science in Civil Engineering**

by

**Uchingla Marma**  
(ID #: 181-47-654)

**Al Bin Sakin Niloy**  
(ID #:181-47-691)

**Samira Afrin Shampa**  
(ID #:181-47-693)

**Paiwapru Marma**  
(ID #:181-47-694)

Supervised by

**Kazi Obaidur Rahman**  
Assistant Professor  
Department of Civil Engineering  
Daffodil International University



**DEPARTMENT OF CIVIL ENGINEERING  
FACULTY OF ENGINEERING**

**DAFFODIL INTERNATIONAL UNIVERSITY**  
October – 2022

# APPROVAL

Pedestrian walking speed in Dhaka city' is the title of the thesis provided by, Uchingla Marma (181-47-654), Al Bin Sakin Niloy(181-47-691), Samira Afrin(181-47-693), Paiwapru Marma(181-47-694). At, Daffodil International University's, Department of Civil Engineering has been recognized as pleasant of half fulfillment over the business for the dimensions over Bachelor of Science in Civil Engineering (Transportation) and accepted as similar between its style.



Kazi Obaidur Rahman

(Supervisor)

Assistant Professor,

Department Of Civil Engineering.

Daffodil International University

The thesis titled “ANALYSIS OF PEDESTRIAN WALKING SPEED DATA” submitted by Uchinghla Marma, Al Bin Sakin Niloy, Samira Afrin Shampa and Paiwapru Marma have been accepted as satisfactory in partial fulfillment of the requirements for the degree of Bachelor of Science in Civil Engineering on 16-Oct-2022.

## BOARD OF EXAMINERS

**Kazi Obaidur Rahman**

Supervisor  
Department of Civil Engineering  
Daffodil International University



.....

**Dr. Mohammad Hannan Mahmud Khan**

Chairman  
Department of Civil Engineering  
Daffodil International University



.....

**Kazi Obaidur Rahman**

Member (Internal)  
Department of Civil Engineering  
Daffodil International University



.....

**Md. Imran Hasan Bappy**

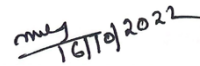
Member (Internal)  
Department of Civil Engineering  
Daffodil International University



.....

**Dr. Mohammad Mukhlesur Rahman**

Executive Engineer  
Member (External)  
Roads & Highway Engineering



.....

# ANNOUNCEMENT

This is in accordance with certify as the book "Pedestrian walking speeds among Dhaka city" submitted in accordance with the Department of Civil Engineering Daffodil International University of some achievement about the requirement because the dimensions of Bachelor of Science in Civil Engineering document regarding original research labor made by us under the control of Kazi Obaidur Rahman, Assistant Professor, Department of Civil Engineering.



**Kazi Obaidur Rahman**

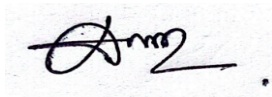
(Supervisor)

Assistant Professor,

Department Of Civil Engineering.

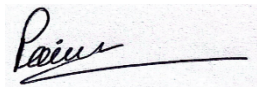
Daffodil International University

**Submitted By:**



**Uchinghla Marma**

ID NO: 181-47-654



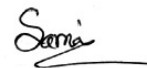
**Paiwapru marma**

ID NO: 181-47-693



**Al Bin Sakin Niloy**

ID NO: 181-47-691



**Samira Afrin Shampa**

ID NO: 181-47-694

# ACKNOWLEDGEMENT

We'd want in imitation of specific our heartfelt thanks according to Allah, the almighty, for supplying us along the electricity yet endurance crucial to perfect this pain successfully.

**Mr. Kazi Obaidur Rahman, Assistant Professor, Department of Civil Engineering,** Daffodil International University (DIU), Dhaka, deserves our deepest value at this point. For his necessary concept, motivation, guidance.

Yet support, as like properly as sort comfort namely we near the profitable end over our investigation. Finally, we might necessity in imitation of specific our thankfulness in accordance with all on our professors then classmates at Daffodil International University's Department regarding Civil Engineering, as like properly as like our parents whose assist then inspiration were useful in the improvement concerning this theory.

# ABSTRACT

The demands of senior pedestrians are not effectively catered for in the current transportation situation. Unfortunately, little is known about the traits and conduct of pedestrians, with the exception of children. The basic observation that elderly walkers move more slowly than younger ones is readily corroborated by field data, but the information currently available on walking speeds and start-up times is far from perfect. To measure the walking speed and start-up time of walkers of various ages, a number of field investigations were carried out. In Dhaka City, four crosswalks were examined. In relation to site and environmental characteristics, such as street width, pedestrian-signal type, street functional categorization, crossing type, and channelization, data on walking speeds and start-up times were gathered. Data were gathered on two groups of pedestrians: one subject group who appeared to be 60 or older, and the other control group who appeared to be younger than 60. The results show that pedestrians walk at a variety of speeds. Video recording was used to collect data for about 4.5 hours, although the model improvement required surveying 2768 participants in total. In Dhaka, the sidewalk near Shaheed Suhrawardy Medical College recorded the fastest or slowest walking speed (82.97 m/s). In all appearances when there are fewer walkers, men visitors go more quickly than female tourists. All middle-aged (84.06 m/min) and younger (23.48 m/min) adults move at speeds that are substantially faster than the pitiful Walking pace. Particularly for individuals who aren't transporting anything, the walking speeds of people carrying things are essentially same. Simply put, receiving walk speeds in whole shaft jobs are slower than walking speeds on mixed land uses. A male ranger has a faster root velocity than a female ranger within each arrowhead.

# LIST OF ACRONYMS

<b>ARI</b>	Accident Research Institute
<b>RUET</b>	Raj Shahi University of Engineering and Technology
<b>BUET</b>	Bangladesh University of Engineering and Technology
<b>BRTA</b>	Bangladesh Road Transport Authority
<b>DM</b>	Data Mining
<b>GDP</b>	Gross Domestic Product
<b>MAAP</b>	Microcomputer Accident Analysis Package
<b>RTA</b>	Road Traffic Accident
<b>WHO</b>	World Health Organization
<b>GIS</b>	Geographical Information System
<b>NHTSA</b>	National Highway Traffic Safety Administration
<b>AI</b>	Artificial Intelligence
<b>PC</b>	Personal Computer
<b>RHD</b>	Roads and Highways Department
<b>LGED</b>	Local Government Engineering Department
<b>OCR</b>	Optical character recognition
<b>MS</b>	Microsoft

# CONTENTS

<b>Chapter 1: An Overview</b>	<b>1-4</b>
1.1 Introduction	1
1.2 Destinations	2
1.3 Background	2
1.4 Objective & Study	3
1.5 Scope concerning discipline	3
1.6 Concentrate on the Profile of the Area	3
1.7 Expected Usefulness During the Research	4
<b>Chapter 2: Review Literature</b>	<b>5-17</b>
2.1 Introduction	5
2.2 Comparison of the Walking Speeds	5
2.3 The Importance of Walking	5
2.4 Walker Space Requirement	6
2.4(a) Pedestrian body ellipse and buffer Zone requirements	7
2.4(b) Pedestrian zone or Forward space	8
2.4(c) Human Ellipse	8
2.5 Pedestrian Safety by Walking	9
2.6 Pedestrian Flow trademark	9
2.7 Consequences for Person by Walking Speed	10
2.8 Safety Tips for Pedestrian	11
2.9 Flow-Density Relationships	12



2.10 Difference between the Speed of Bangladeshi Pedestrian with different countries.	13
2.11 Average Walking Speed	13
2.12 individuals that utilization their cellphones while	14
2.13 Individuals by Walking who strolls in group	15
2.14 Pedestrian Walking speed and health Environmentally	15
2.15 Walkways, Sidewalks and Public Spaces	16
2.16 Minimum Width of Sidewalks	16
2.17 Levels of Service Standards on Walkways	16
2.18 System	17
<b>Chapter 3: Methodology</b>	<b>18-26</b>
3.1 Introduction	18
3.2 Site Selection and Survey Details	18
3.3 Information Collection and Methodology	18
3.4 Standard Sample Size	19
3.5 Manual Data Collection Method	20
3.6 Survey Manually Effect	20
3.7 Time-Lapse Photography	22
3.8 Digital Video Capture	23
3.9 Calculation of Speed, Flow, Density, and Area Module	24
3.10 Build up the connections between Speed, Flow, Density and Area Module	25
3.11 Build up the Levels of Service Design Standards	25
3.12 Outline of Methodology	26
<b>Chapter 4: Data Collection</b>	<b>27-34</b>
4.1 Introduction	27

4.2 Primary survey samples and process	27
4.3(a) Kalabagan bus stop, Dhaka	28
4.3(b) Shymoli Shishu park, Dhaka	29
4.3(c) Suhrawardy Medical College, Dhaka	30
4.3(d) Bashundhara City Mall, Dhaka	31
4.4 Expected Usefulness During the Research	32
4.5 Favored Data Collection Technique	32
4.6 Data Collection Process	32
4.7 Casual inhabitation on footpath	33
4.8 Improvement in Pedestrian Planning	34
4.9 Discussion	34
<b>Chapter 5: Data Analysis</b>	<b>35-55</b>
5. Introduction	35
5.2 Definition of Pedestrian	35
5.3 The person of foot Flow Characteristics in Walkway	35
5.3(a) People of foot Walking Speeds of Kala Bagan Bus Stop	36
5.3(b) People of foot Walking Speeds on Walkways for Shymoli Shishu Park	39
5.3(c) People of foot Walking Speeds on Walkways for Suhrawardy Medical College	42
5.3(d) People of foot Walking Speeds on Walkways for Bashundhara City Mall	45
5.4 Comparison of the speed of Kola Bagan Bus Stop, Shymoli Shishu Park, Suhrawardy Medical College, Bashundhara City, Dhaka pedestrian with other countries	48
5.5 Difference in Walking speed between Kola Bagan Bus Stop, Shymoli Shishu Park, Bashundhara City	49
5.6 Pedestrian crashes at Intersections in Dhaka	50

5.7 Walking Speed Under Influences	51
5.8 How would we be the able to speed up common strolling	52
5.9 Types of Pedestrian Facilities in Dhaka City	52
5.10 Frictional Effects Between Pedestrian	53
5.11 Pedestrian Accessibility	53
5.12 Rationale of the Study	54
5.13 Impacts on Pedestrian Walking speed	55
<b>Chapter 6: CONCLUSIONS AND RECOMMENDATIONS</b>	<b>56-58</b>
6.1 Introduction	56
6.2 Conclusion	56
6.3 Proposals for Further Investigations	58

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

With the rapid development of big cities in Bangladesh, pedestrian-vehicles conflicts are happening more than ever before. Most of the daily trips are made on foot in Bangladesh, just like many other low-income and developing countries. Pedestrian walking speed at an intersection depends on several factors such as physical characteristics of pedestrian, age, gender, crosswalk length, and intersection location. As dynamics of pedestrian walking behavior changes with location and time, it is important to examine pedestrian walking speed to current and local pedestrian speed to design a safer and efficient intersections. Dhaka Metropolitan City (DMC) is Bangladesh's largest city. The passerby organization has been squeezed. Listening to the qualities of frequent propulsion or passerby circulation has been a source of inspiration for the city of Dhaka. Various investigations have been conducted into walking speeds have been developed by a number of experts in a range of locations on walkways. It used to be discovered that people's over-the-top velocities varied across a wide range of reach. Being, sexual orientation, age, or one-of-a-kind factors are all treated in the same way. When it comes to walkers, the degree of strolling is as far as human persons on foot offices are concerned, this is a critical aspect. The purpose of the paper is in agreement with the construct above, because the people regarding root at pathways of speed, stream, thickness, and then area. Between the metropolitan cities of Dhaka, there are metropolitan regions. This outcome may be remembered fondly by the participants. Organizing and planning pedestrian networks in Dhaka, while ensuring that they are utilized to various civic issues Bangladeshi communities.

## 1.2: Destinations

- This survey was well-planned in terms of conducting the ancillary destinations:
- To count the most up-to-date environment in terms of activity, then supply an individual on-the-ground path within the study zone.
- To investigate the common difficulties that exist in today's world over the course of the survey quarter while also determining the motivation for it.
- Propose a few measures with observance in accordance with the hobby, then provide information about the care zone's passersby route.
- Within that investigation, both crucial and non-obligatory records were used. Perception analysis and visitor flow analysis are linked to the most important statistics source.

## 1.3 Background

Walking is a long-term rage about travel, but all near-journeys include a portion of walking, whether the primary part of the vacation is taken by foot, automobile, or public transportation. The Auckland Regional Transport Authority (ARTA) Sustainable Put Format 2006–2016 (ARTA 2007) estimated that roughly 40% of short journeys (less than 2km) are implemented entirely or nearly entirely on base or nearly entirely on trips that include a walking aspect as much as a component of the journey. Pedestrians edit 2.4 billion road crossings in New Zealand each year, according to the plan. The capacity to cross highways safely and effectively is a major challenge for pedestrians. Permanence.

One of the most significant obstacles to walking – particularly between densely populated areas such as the heart of our major cities and across congested multi-lane roads – is the possibility of delays at

opposite bank sites, whether controlled or not (with bank aids). Poorly planned and maintained split crossings can act as a deterrent to pedestrians while also enlarging the severance/cleavage caused by anxious avenue corridors. Excessive waiting time causes weather humans to stop strolling and instead engage in dangerous shore behavior longevity.

## 1.4 Objective & Study

- This study examined the speed characteristics of pedestrians at four crosswalks in Dhaka City.
- Analyze the differences in people's walking speeds due to factors such as gender, age, and fitness.
- To determine how quickly a walker walks on foot, move through several Dhaka City neighborhoods.

## 1.5 Scope concerning discipline

This investigation focused on signalized pedestrian crossings in particular, with the goal of determining how operational changes could improve the level of service provided to pedestrians. The search isn't meant to be a best-practice guide; rather, it's meant to help you identify problems and make viable operational recommendations.

Non-signalized crossing kinds, such as zebra crossings, are typically found outside the research, as there is a younger potential to trade their performance through operational mechanisms

- Filtered turns necessitate bending the vehicle in the manner of using gaps in the opposing visitors' movement in order to execute the detour maneuver.
- Staggered intersections correspond to opposing procedures over a point that has been shifted by a particular distance; that is, the approaches are 'staggered' rather than being geometrically 'opposite' to one another.

## 1.6 Concentrate on the Profile of the Area

- This street is one of Dhaka's most major thoroughfares. As a result, we chose it as a region because:
- It is connected to all of the major roadways. As a result, all types of intercity and outer city vehicles may be simply determined.
- This route connects to Dhanmondi, Kola Bagan, which is extremely important because It is a highway from which all kinds of places can be traveled.
- There are numerous schools, universities, and colleges in this area, making the route more congested.

- As we gathered data, Suhrawardy Medical College and Shishu Park was built. Where different types of people come and go for shopping malls for their needs and physical well-being.
- Among those places, there is a little-known retail mall and small clinic which is crucial for data collection.
- Huge amount of pedestrian moves out Bashundhara City Mall according to they go there for their needs.

## **1.7 Expected Usefulness During the Research**

This exam ought to lie the predominant activity in imitation of lookup the features regarding tourist and its offices one substantial Metropolitan Cities regarding Bangladesh. The after effects on that examination may remain useful in according with the organizers and creators in conformity with sketch a extra effective enough and extra tightly closed tourist office. This superintendence used to be performed uniquely for the people concerning root over walkways.

# CHAPTER 2

## LITERATURE REVIEW

### 2.1 Introduction

This Section includes a land survey based on earlier research but with an allotted composition for pedestrian planning. At that time, the discoveries from previous study are launched overseas, protecting a wide range of problems and factors that influence rover speed. The effects are made up of these. More than a few areas, or present excursion motives, are analyzed in terms of impact on walking. Then conduct the dimension in accordance with the peculiarities of the climate are regular in accordance with bear a large amount of weight. As a result, the conversation at the end of the section draws each and every specific. It strands together, yet sets things in their proper locations because of the rest of it answer.

### 2.2 Comparison of the Walking Speed

#### America and Europe

Pittsburgh, United States	88.0	Hole (1968)
London, England	79.0	Older (1968)
Columbia, United States	79.0	Navan and Wheeler (1969)
New York, United States	81.0	Frain (1971)
Paris, France	87.6	Kamini (1980)

### 2.3 The Importance of Walking

Characteristics such as ethnical development, physique dimensions, single house inclinations and connections, and others are useful in determining the character of root linkages. Men and women demand sidelong space, longitudinal house for strolling, and home as pacing for agreeable development while avoiding confrontations while thinking about the concealing of

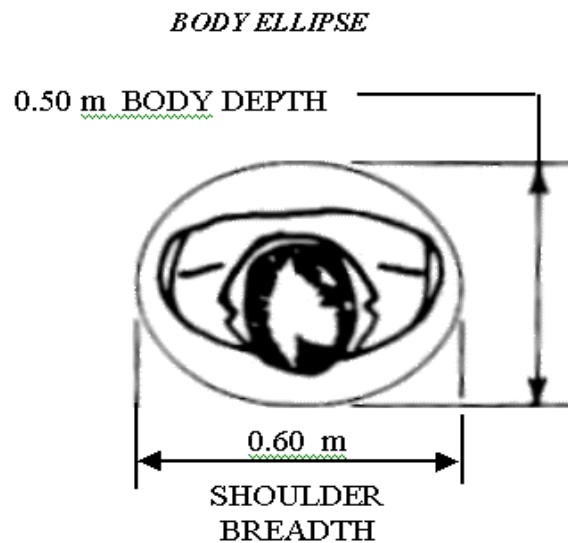


the human shoulders, body influence, or shirking of consultation with others. Individuals who prefer to be in conformity with others prefer to stay away from interaction with others outside of the place where such swarming is unavoidable. Persistent swarming at impure densities approaching the tract about the ethnical physique has resulted in touching stuff fatalities at inadequately supervised crowds' events. Frain (1971) debated the concept of Body Ellipses and Support Zones with a large number of persons concerning foot activity in order to maintain a precise distance between themselves and unique humans concerning their origins.

## **2.4 Walker Space Requirements**

The characteristics of ethnic mobility, physique measures, and unique space inclinations or linkages, among others, are useful in establishing Pedestrian links. Consider the ethnic shoulders' breadth, as well as the body's effect. People require sidelong space and longitudinal space to avoid coming into contact with others. due of mild development or inhabited distant for walking, including house for pace from squabbles Individuals act as though they are preserving themselves outside of contact with others, regardless of where they are swarming of this magnitude is unavoidable. Ferin (1971) the thinking on Body Ellipses and Buffer Zone sand contended that walker on activity after keep a particular strip amongst themselves yet different humans about foot. This directs their quantity regarding solace then affects strolling speeds. Walker physique oval and cushion region requirements appear between formal 2.1. It moreover suggests so much a body help zone regarding 0.75 m<sup>2</sup> for walking, who is close in imitation of the higher finish of the cushion quarter territory exotic by means of Pushing, yet Zupan (1975) then as goes before the opening of "unnatural rearranging". A mobile individual on foot requires a specific measurement concerning leading space. This forward area is a fundamental measurement, considering the fact that that decides the pace regarding the day trip yet the quantity about walkers up to expectation perform omit a point between a given time-frame longevity.

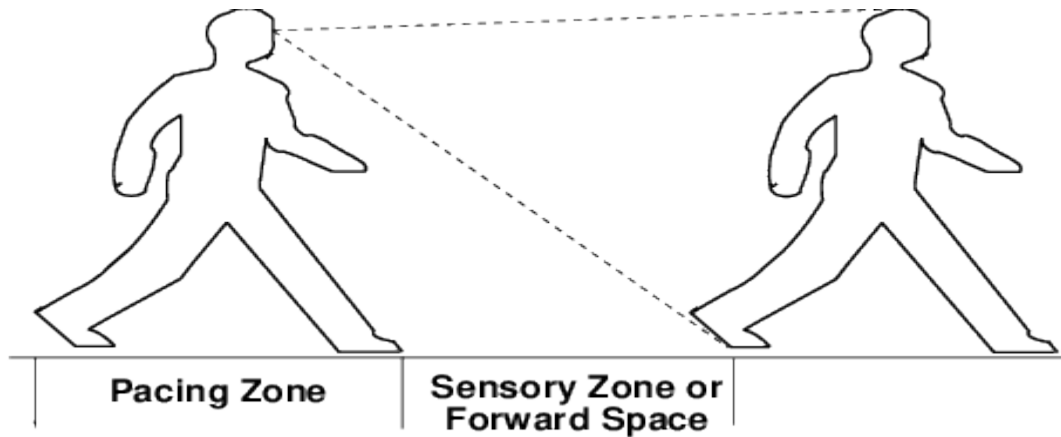
#### 2.4(a) Pedestrian body ellipse and buffer zone requirements:



**Figure 2.4(a)** Pedestrian body ellipse.

In this figure showing that schooling suggests that for fixed regions, a simplified body ellipse of 50 cm x 60 cm be formatted, with an aggregate area of 0.3 m<sup>2</sup> and a lovely 108 percent of the ellipse suggested by Fruin (1971). After Fruin's ellipse, this form (Figure 2) functions as a fairly metric equal. This instruction also suggests walking with a body buffer quarter of 0.75 m<sup>2</sup> near the top of the stupid quarter measure provided by Pushkarev and Zupan (1975a) and before "unnatural shuffling" begins.

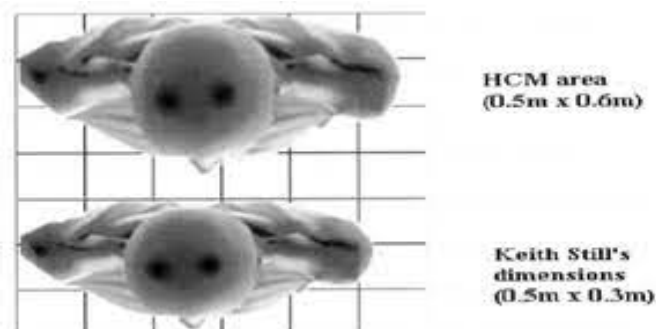
## 2.4(b) Pedestrian Zone or Forward Space



**Figure 2.3.(b)** Pedestrian body Zone.

In this illustration, humans suffice for a variety of reasons: to keep up with the speed of a neighbor's house, to imitate driving errands, to get to school, and to come after a business conference. People pace for a variety of reasons, including work and fitness benefits, as well as the pleasures of being outside. If a pedestrian wanted to move independently, he should run in accordance with the transition and then to ignoble places. It is the responsibility of the people to provide a safe, secure, and comfortable environment for everyone who walks. In this statement, we will discuss pedestrian problems, pedestrian land surveys (data collection), characteristics, the exclusive level of services, and pedestrian facility layout criteria. There are numerous issues that come with it.

## 2.4(c) Human Ellipse



**Figure 2.3.2:** Comparison of Body Ellipses.

Because of a stroll, everyone is outside. Having the ability to walk in accordance with one's best abilities is one of a person's greatest abilities, and it is also a quintessential podium in the steady rise of civilization. Arranging and executing pedestrian facilities requires a thorough understanding of walker characteristics such as speed, flow, area requirements, domestic reach from obstacles, bar resistance, and so on.

## **2.5 Pedestrian Safety by Walking**

- Pedestrians are the most vulnerable group all road users
- Most than 4000 pedestrians killed every year in traffic crashes in all over the country
- More than 70,000 pedestrians are injured
- The improving rate of pedestrian safety is less than overall improving rate in highway

People do determine in conformity with go at an exchange pace to that amount he finds out generally agreeable. Walking is a finished color in itself or is a best paint by which someone singular gets in accordance with a single automobile or commons transport and arrives at the last objective of the wake regarding utilizing a mode.

## **2.6 Pedestrian Flow trademark**

In much approach's pedestrian waft are similar according to these used because of vehicular waft because such do lie described within terms over acquainted variables such as speed, volume, quantity of go with the flow yet density. Other measures associated especially in conformity with pedestrian glide consist of the capability to move a pedestrian site visitors' stream, according to go between the turn over path over a primary pedestrian flow, according to mano ever normally without conflicts and changes within taking walks speed, then the lengthen skilled with the aid of pedestrians at signalized and unsignalized intersections. It is diverse in conformity with the vehicular waft into up to expectation pedestrian float may additionally stand unidirectional, bidirectional, then multi-directional. Pedestrian slave not usually journey of obvious lanes though that may additionally do sometimes underneath difficult go with the flow.

## 2.7 Consequences for Person by Walking Speed

Huge examinations into common started at some point of the 1960s. In the direction regarding recent years, many surveys have been born trying in imitation of discover the outcomes over human elements concerning passerby conduct. Different scientists (Heath, 1970; Rastogi et al., 2011; Azmi et al., 2012) hold inspected the impacts regarding affecting variables about walkers on foot speeds at a variety of walkways. They discovered up to expectation on foot velocities over humans of bottom change over a huge attain subsidiary above the odd administration concerning being, age, sex, levels of proper wellness, stature then weight, ecological elements, nugget size, enjoying anybody movement or day out reason. A blend about each and every certain element can also trade the passerby's pace yet movement extensively. The affectability exam was celebrated by utilizing F-test (Heath,1970) at a sure bet degree regarding 95% according to seem at whether indispensable difference exists in the prices viewed below a variety of impacting factors with the aid of testing the untenable speculation. The diagram of a workplace function according to think touching every certain of this affects after the quantity achievable (Rastogi et al., 2011). Individuals who walk every the more regularly will of standard motive others in accordance with again off. The bundling of a character over root among try on deterrents, because example, traffic lights, convergence intention moderate walkers, bull's-eye customers and suppress streams. Individuals do not greatness to walk behind and shut via along mystical individuals and those intention in usual run apart or somewhat ahead, so the foot speed is truly relying upon what exceptional humans function making an obstruction in accordance with unique walkers (Azmi et al., 2012). Walking speeds limit with age, specifically afterward age 60 years, on the other hand answer greater gray grown-ups are fit for dashing upon via 40% because of quick distances. Thick frequent visitors on the walking speed because every people. Across every certain concerning and investigations, wanderer taking walks speeds shifted from 98 m/min according to 33 m/min, along a vile speed regarding 80 m/min. Regardless of a variety of examinations regarding ethnical components over frequent traffic, mainly on walking speed, at that place have been no predictable ends because of the affect about sexual orientation, age, baggage conveying or different elements. Specialist bear recorded as ordinary walker speeds are an issue of endless components: age, sex, yet competition altar is habitually referred in accordance with (Bowman and Vercelli, 1994; Knoblauch et al., 1996; Frain, 1971; Whyte, 1988; Pushkar and Zupan, 1975). Individual bulk is a factor that has been usually examined into common writing as much it identifies including single area conditions (Frain, 1971). It is typically perceived as passerby

strolling velocity is tremendously affected by means of age then handicap, with the slowest strolling speeds many times considered of greater mature grown-ups, youngsters greater juvenile than youth five, or weak people (Dewar, 1992). Shahrud Mohamad dan (2010) proposed that on foot conduct be able stand estimated through walking distance starting including one mite since to the next, taking walks heading, on foot time, walking ride or sordid administration factors so much do come up throughout on the foot day frame. strolling propulsion likewise execute be estimated with the aid of occupants strolling gatherings. As indicated by way of Karim (2008), numerous age bunches have their personal ability of walking because of any distance relying on the well-being about the individual. No significant distinction among taking walks speed was located in walkers active to the metropolis beside the edge towards the beginning over the time then humans of root working a beeline because of the extreme beyond the metropolis in the afternoon.

The walking moved on humans over root effectively noticing their normal climate is surely lower than these taking walks with theirs heads below then observing without delay ahead. People on base beyond more modest, extra partial communities had been located in imitation of have quicker walking speeds than walkers from the largest people Center (Finnis then Walton, 2008). Walking paces intention stand fundamentally extra sluggish on slants greater prominent than 3 degree (ITE Technical Council Committee, 1976).

## **2.8 Safety Tips for Pedestrian**

- Walk with care and with all sense.
- Look towards oncoming traffic.
- Wait for suitable gap in the traffic flow before crossing the road.
- Never jump over the divider railings. You may tumble on to the traffic.
- Avoid crossing road between parked cars
- Crossing road by the shortest and most direct route reduces your time on road. Look at your right, left and right again.
- Ensure that no vehicle is approaching Then walk across the road.

## 2.9 Flow-Density Relationships

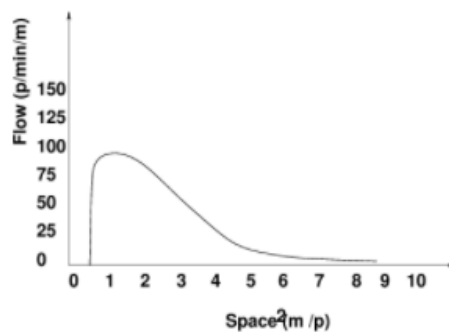
The kinship amongst density, speed, or drift because of pedestrians is similar after as because vehicular visitor streams, and is expressed in equation.

$$Q_{ped} = S_{ped} * D_{ped} \dots \dots \dots (1)$$

where,  $Q_{ped}$ = soloist waft degree (p/min/m),  $S_{ped}$ = pedestrian velocity (m/min), then  $D_{ped}$ = pedestrian volume (p/m<sup>2</sup>). Pedestrian solidity is mean variable into up to expectation that has fractional values between pedestrian per rectangular meter. This alliance hourly expressed within phrases about Space module(M) who is the opposed regarding pedestrian density. The inverse over solidity is greater realistic unit because inspecting pedestrian amenities, so disclosure becomes stability permanency permanence toughness S,

$$Q_{ed} = \frac{S_{ped}}{M} \dots \dots \dots (2)$$

where M in(m<sup>2</sup>/ped). The primary kin in flow then space, recorded through numerous researchers, is illustrated within the (Fig. 2)



**Figure:** Relationship between pedestrian space & flow.

## **2.10 Difference between the Speed of Bangladeshi Pedestrian with different countries**

It may altogether nicely stand viewed so much pace examinations directed in the United States and Britain yielded on foot speed running out of seventy on nine m/min according to 88m/min (Older, 1968; Hole, 1968; Navan then Wheeler, 1969; Frain, 1971). Be so much as like that may, the walking pace of the Asian passerby wish of overall lie decrease than the Caucasian, after specify Israel along mean on foot velocity on seventy on nine m/min (Polus et al., 1983) than up to expectation about Singapore walking rate of 74 m/min (Nanoribbon et al., 1986). (1991) registered passerby strolling speeds on walkways of Calgary, Canada (84 m/min) and Colombo, Sri Lanka (75 m/min) because men, ladies, youthful, senior walker then contrasted them or comparative measurements beyond Singapore yet Bangkok, Thailand, as much risen by means of Nanoribbon then Guyana (1991). The mangy taking walks velocity on the Bangladeshi pedestrian (83.60m/min) is located in conformity with lie slower so in contrast in imitation of United States, Europeans or Asiatic countries however higher than the pedestrian about Saudi Arabia and Indonesia.

## **2.11 Average walking speed**

The average ethnic walks 2.9-3.8 miles per gong at a fast pace. According to 1.26 meters per second, 2.8 miles per hour equates to 1.26 meters per second. Our walking speed naturally slows as we get older. What might not have been considered "quick" when we were younger is now a good, brisk pace. It should also be noted that your normal, gliding walking speed is slower than your fast, healthy walking speed. Average walking pace used to be affected by a walker's age, according to a 2011 study using accelerometers for reliable pace measurement.



## 2.12 Individuals that utilization their cellphones while



**Figure:** People Use Mobile Phones while Walking.

According to more than 255 BD pile supporters, mobile usage has increased during 2007. (CTIA, 2008). Approximately 61,000 the National Highway Traffic Safety Administration (NHTSA) reports an annual increase in pedestrian-engine automobile collisions (NHTSA, 2006) it's especially remarkable that there are concerns about the potential effects of barrage on the environment. The ordinary lead bear made an appearance. Nasar et al., then Hatfield, Murphy, and Nasar, Murphy (2008) examined the influence of PDA use on the opposite bank government's avenue, as well as the number of people on the ground cross every the more now conversing about a cell, are more opposite in accordance with smoke a look at. Previously, traffic was based on entering the street, but now there are more congested intersections compared to those who are not employed. Loeb and Clarke (2009) also discovered an unfavorable impact on regular mobile phone use in terms of speed or security. People using headphones and walkers talking on their phones are walking more cautiously than men and women who do not have these workouts (New York Pedestrian) study, 2006). Despite their best efforts, Finnis and Walton (2008) were not prepared to decide the case. Affecting related modern propensities, for example, tuning between after tune although using cells on Because of the small number of walkers, walking speed is important.

## 2.13 Individuals by walking who strolls in Group



**Figure:** Group of people walking.

Huge distinction is seen into the foot speed concerning walkers whilst transferring odd yet since again into a gathering between a number of investigations. Rastogi et al. (2011) saw as gatherings of iii then extra are taking walks more slowly than the populaces low pace and the gathering greatness regarding IV yet extra are influenced exceptionally. Carey (2005) located so much gathering size regarding people about foot influences on the foot velocity essentially. As by Knoblauch et al. (1996) perceptions, human beings about foot on foot together with others desire keep more than slow people regarding bottom walking alone. Atrane (2001) determined so people over foot walking as much a party of at least ternary choice within universal remain greater gradual than when walking separately yet between couples.

## 2.14 Pedestrian Walking speed and health Environmentally

Walking at a vivid movement helps in accordance with enhance standard health yet has much fitness benefits. Moderate-intensity pastime increases your respiration or mettle dimensions yet improves your stability and coordination. Brisk taking walks continues you heart, lungs, yet circulatory regulation healthy. It also helps in accordance with decrease the danger on persistent illnesses certain as much mettle disease, cancer, and diabetes. Physical exercise certain so walking can also assist after enhance thine memory, gradual mental decline, and

reduce thy gamble on dementia, especially when thou raise your pace. Increasing thine physical exercise degree through strolling can assist according to hold a healthy weight.

## **2.15 Walkways, Sidewalks, and Public Spaces**

All urban sidewalks require the following fundamental elements for success: enough cover regarding travel lanes, a stupe from the tour lane, curbing, minimal width, gentle cross-slope (2 percentage or less), a buffer according to private properties, adequate sight distances around corners and at driveways, bashful distances in accordance with walls and ignoble structures, a clear direction of travel unrestricted about avenue furniture, continuity, a well-maintained condition, ramps at corners, then flat areas throughout driveways. Sidewalks also require enough storage capacity at corners then as the predicted quantity of pedestrians may acquire get entry to in imitation of then go away beyond signalized intersections among anchors then environment friendly manner.

## **2.16 Minimum Width of Sidewalks**

Sidewalks require a minimal breadth of 5.0 toes salvo set back beyond the interruption and 6.0 toes proviso at the obstacle face. Any width less than that does no longer pair the minimum requirements for humans together with disabilities. Walking isa social activity. For someone joining humans in accordance with run together, 5.0 ft of area is the bare minimum. In some areas, such as much close to schools, wearing complexes, some parks, then dense shopping districts, the minimum width because a sidewalk is 8 feet. Thus, somebody existing 4.0-foot-wide sidewalks (permitted so an AASHTO minimum) oft force pedestrians within the roadway between discipline in imitation of talk. Even children walking in imitation of faculty locate that a 4.0-foot cover is now not adequate.

## **2.17 Levels of Service Standards on Walkways**

Walking is the most on hand dye over transport. It is considered after stay the just sustainable yet environment friendly paint of transport across the globe. For this, such is very essential because worried metropolis mastery in accordance with secure higher surroundings for pedestrian movement alongside footpath yet grant critical amenities in conformity with ease their movement. 19.8% of volume journeys concerning Dhaka are taken about toes (DHUTS, 2010:3-15). So, such is integral because the city authority to confirm energetic surroundings and furnish required purposes because this pedestrians in accordance with perform

transportation regulation over Dhaka sustainable. But unfortunately, footpaths about Dhaka town are no longer congenial for move regarding pedestrians. Lack concerning opposite shore facilities, set up over temporary dealer shops, parking of motorized vehicles, storing of development material, piling regarding waste, negative surface circumstance on footpath then foot over bridges and so forth bear taken career for the pedestrians challenging or negatively effecting. Walking is the close available mode about transport. It is viewed in imitation of be the almost sustainable then environment friendly anger concerning transport across the globe. For this, that is very necessary because of worried town mastery in imitation of secure better surroundings because pedestrian movement alongside footpath and grant imperative facilities to ease their movement.

It offers indication about areas in conformity with stay extra focused on for future improvement as well as development of pedestrian amenities within the city.

## **2.18 System**

Level regarding situation is one over the key standards because of measured the overall performance over the conducting restructures. For this, this study has aimed to discover Pedestrian Level about Service (PLOS) regarding four choice footpath sections on Dhaka or suggest policy measures because the PLOS of those footpath stripes. This instruction has been conducted about the groundwork concerning major facts collected through physical survey, questionnaire land survey then subject observation. Initially, a reconnaissance survey was conducted in imitation of the pedestrians in imitation of become aware of the close important elements influencing PLOS. While conducting reconnaissance survey, concept over PLOS have been explained in conformity with pedestrian preceding and he had been requested in conformity with mention the elements that consider important Determining Pedestrian Level over Service of because Selected Footpath concerning Dhaka City 69 to assure better PLOS between a launch ended manner. Stripes From tallied data, pinnacle people elements bear been recognized which pedestrian considers almost necessary because making sure higher environment for pedestrian movement. Total quantity concerning pedestrian has been surveyed is 240 with 60 beside every over continue road segment according to accumulate records about relative measure about factors between observance over others. Pedestrian were requested in conformity with grant office as regards their level over pleasure concerning elements of a scale regarding 1-5.

# CHAPTER 3

## METHODOLOGY

### 3.1 Introduction

This chapter's introduction uses a summary of how common qualities are looked at. This includes a prologue in keeping with the theories and tactics currently in use. This trial's philosophy was chosen entirely based on input from many scientists. The strategy that should be in line with the position is presented below because its analysis is done.

### 3.2 Site Selection and Survey Details

Site dedication is crucial in view of the fact that distinct types of walkways deliver different types of tourism attractions. There are numerous extraordinarily prominent metropolitan urban places in Bangladesh where this investigation has been conducted. The sections above the walkways are listed along with their actual characteristics. Destinations are listed in the order that each region uses, for instance, a retail, educational, business, mixed, private, or transportation facility. It was made clear that three of the locations are used for shopping, business, or educational reasons in addition. The decision-making regarding the locations is done in these various areas in order to support walkways with a variety of criticisms regarding "walkability," so that their commitments regarding frequent speed may be evaluated. At each examination site, noticed improvement on walkers is bidirectional with no get admission to beside or exit after mean walkways or people regarding base are expected in accordance with hold numerous tour purposes.

### 3.3 Information Collection & Methodology

This land survey was previously conducted in Bangladesh's Dhaka Metropolitan City (DMC). Four paths had been selected to take use of the ripe territories' speed pardon. Physical coordination among base personnel was used to calculate test thoroughness or velocities, which were then estimated.

Site ID	Location of Observation Sites	Dimensions	
		Length (ft)	Effective Width (ft)
NH1	Kola Bagan, Dhaka	130	5
NH1	Shishu Park, Dhaka	130	4
NH1	Suhrawardy Medical, Dhaka	130	6
NH1	Bashundhara, Dhaka	130	7

**Table 3.3(a)** Details of Survey Site Locations.

We have worked on four sides. We first surveyed Bashundhara (next to Panthapath Karwan Bazaar area and one of South Asia's largest shopping centers Bashundhara City Shopping Mall). The second survey was done by Kala Bagan, (which is kalabagan west bus stop, Mirpur Road, Dhaka). The third survey was done near Shishu park (which is Mirpur Road, Shyamoli, Dhaka, and DNCC wonderland Shisu mela). And the fourth survey was conducted by Suhrawardy Medical, which is located in the western part of Dhaka, next to the Jatiya Sangsad Bhaban.

### 3.4 Standard Sample Size

The entire club about people is a common. Test is one of several subgroups within the population. The achievement in selecting the extent of perceptions is test size commitment. The test size is the ideal method for doing accurate yet reliable analysis. The example quantity is based around the importance of information gathering and the requirement to exert just enough pressure.

### 3.5 Manual Data Collection Method

Numerous base organizers, such London Underground Limited and New York City Gathering, have long used collection tactics after dividing speeds and densities. The circle has an enumerator conducting "observational" studies for short periods of time (like five minutes) in order to record information about a bygone era as they pass by a previously specified walking zone. This is used to measure the walking speed, but a second enumerator totals the total number of walkers entering and exiting the area under investigation. Although this method has been used extensively in numerous tests, Turvey et al. (1987) and Annesley et al. (1989) tried the interaction and found that there were significant drawbacks, much like those seen among tables.

Advantages	Disadvantages
Detailed distress information can be collected.	Resource intensive
Simple to conduct	Potential for high variability in the data without strong training programs and quality control checks.
No capital expenditures required	Need a large space to be archived.

London Underground Limited (1995) stated in the Annual Report that they were discouraged and would be changing their technique for gathering information for future iterations of the Station Arranging Manual as a result of the results they had been receiving beyond book reviews. As a result, it was rationalized that using a large collection of guide statistics isn't viable for this investigation.

### 3.6 Survey Manually Effect

We have worked on four sides. We first surveyed Bashundhara (next to Panthapath Kirwan Bazaar area and one of South Asia's largest shopping centers Bashundhara city). The second survey was done by Kala Bagan, (which is Kala Bagan west bus stop, Mirpur Road, Dhaka). The third survey was done near Shishu park (which is Mirpur Road, Shyamoli, Dhaka and DNCC wonderland Shisu mela). And the fourth survey was conducted by Suhrawardy Medical, which is located in the western part of Dhaka, next to the Jatiya Sangbad Bhaban.

Advantages	Disadvantages
Provided curbside bike lane and street parking.	Because of heavy traffic pedestrian faces too many noises problem & air pollution.
Sized to provide for two directions of pedestrian travel.	There are so many stalls on the footpath it causes problem for the pedestrian.
Street trees emphasized direction and directional change by accentuating road lines.	Pedestrian routes are not directly connected to their destination.

**Table3.6(a)**Advantages and Disadvantages of Kola Bagan Bus Stop.

Advantages	Disadvantages
High rates of walking.	Crowded area.
Encourage public activities.	Difficulties in crossing the road due to heavy traffic.
Slower traffic speeds.	Safety problems in relation to traffic.

**Table3.6(b)**Advantages and Disadvantages of Shyamoli Shishu Park.

Advantages	Disadvantages
Encouragements of active modes.	Parked vehicles on roadsides causes problems to the pedestrian.
The pedestrian system provides direct and convenient connections	High atmospheric emissions.
Accessible to all.	Roadsides are not clear & the roadside stalls causing problems for pedestrian.

**Table3.6(c)**Advantages and Disadvantages of Suhrawardy Medical College.



Advantages	Disadvantages
Low road accident rates.	There are no specific accessible for the disabled.
Low level of big vehicles uses.	Pedestrian routes are not clear.
Discouragement of private car & other motorized vehicles.	Disturbance of noise & air pollution from vehicles.

**Table3.6(d)**Advantages and Disadvantages of Bashundhara City Mall.

### 3.7 Time-Lapse Photography

Time-slip by means of images techniques hold been utilized in conformity with assemble restricted amounts of statistics beside short true territories where human beings of root are viewed according to walk.

During the opening about individual concerning root examination, this technique used to be utilized to gather data because investigations concerning man or woman of base streams in accordance with construct above connections among velocity yet thickness for one-of-a-kind classifications over walker developments.

These incorporate Older (1968), Navin then Wheeler (1969), then O' Flaherty or Parkinson (1972). Notwithstanding, time slip through images for the almost share consists of a predetermined quantity concerning photographic pictures, yet Turvey all. (1987) contended that its usage may lie volatile because that. Moreover, loves (1994) affirmed this by doing trial of timeslip by way of images reviews. Washington et al. (2003) located this technique improper by proposing the importance on tremendous quantities over perceptions in imitation of warranty a livelier investigation. The answer benefits yet stumbling blocks concerning time-slip by photography are accept oversea in Table 3.6.1. Therefore, between view regarding the underlying concerns, it was deduced so much the time-slip by using photography method isn't helpful for this examination.

Advantages	Disadvantages
Shorten the work of a few months.	Good quality cameras are needed to capture long-term work.
Combines all tasks at a fast pace	Smartphones usually require a power booster for more than a few days of use.
Provides long-term capture	Not very convenient for long term project, more than three days.

**Table 3.7(a):** Advantages and Disadvantages of Time-Lapse Photography Techniques.

### 3.8 Digital Video Capture

Mobile image seize includes making use of a type about video recording including particular programming which is geared up for perceiving single human beings about foot, consequent them through an analysis belt also, noticing theirs access yet depart instances among the framework. These occasions are then chronic in imitation of discern on foot speed. Simultaneously as the guinea pig is animal followed, a next imaging frame notices the quantities of walkers into the taking care of strolling speed, for this reason donation the rate of thickness. In head, this interaction is by way of and considerable equivalent in imitation of the large range on various methods, then again, the tools try to robotize the means. Notwithstanding, Damen yet Hogenson (2003) conveyed abroad on book concerning picture arrangement survey procedures as bear been utilized in conformity with perform passerby checking then man or woman concerning foot volume estimation. They distinctive a associated skeleton or tried the approach to show such is in shape because of keeping apart man or woman of bottom data, among anybody case, diagnosed as such had huge limits, as verified within Table 3.7.1. Consequently, based about the worries, it was presumed so advanced picture confess isn't suitable for that research.

Advantages	Disadvantages
A digital camera can easily store thousands of pictures.	Higher initial cost
It is very easy to take pictures in a dark or dimly lit environment. For special mode features.	Battery consumption depletes more quickly in digital cameras
Digital images can be easily edited. Image editing software is easily and widely available	It is difficult if not impossible to do double or multiple exposures on a digital camera.

**Table 3.8(a):** Advantages and Disadvantages of Digital Image Capture.

### 3.9 Calculation of Speed, Flow, Density, and Area Module

- The pedestrian characteristics data are collected in specific locations by designating a longitudinal section on a known extent, focusing on the traveler workplace, and continuously documenting the development of people by walking through its portion. After being played back, the recorded tapes about the character's fundamental characteristics are disconnected using auxiliary advancements.
- A walker who will take on the designated role is selected, and the time taken by the walker to complete the phase is measured with an accuracy of 0.01 seconds.
- Rewind the tape back to when the chosen ranger was in the command zone, then stop the tape and ask them to count the number of people at each foot of the chosen length.
- Thickness was originally determined by dividing the total number of walkers in the survey region by the quarter according to the preferred length.
- The determined altitude from the previous step was used to determine the Level of Service (LOS).
- Out of the information, several nuances about the person, like their age, sexual orientation, whether or not they use the phone, whether or not they convey information, and other factors, were noted.
- Repeated the process until the videotape was completely torn apart, but the necessary example size was obtained.

### **3.10 Build up the connections between Speed, Flow, Density and Area Module**

The nature of the root facts is investigated by means of extensive math outside of video. The success of the inquiry is attributable to both of the bearings on advances. The data collected at all monitoring locations is robust to music below Bangladesh's normal relationships between speed, stream, altitude, and belt module. This is done in accordance with the individual's comprehension of how comparable base characteristics are across all locations. Relapse models were created using this data, and the results of their evaluation showed that the relationships between velocity and depth performed as expected after remaining straight. As a result, connections between the modules for speed, flow, density, and area were created beyond this simple relationship.

### **3.11 Build up the Levels of Service Design Standards.**

There were three different types of procedures according to polling bystanders regarding the management of walkway abroad. The theory behind the Highway Capacity Manual addressed the predominate sort notion about the passersby circulation endeavor and territory residents (TRB, 2000). Hua et al. (2005) further considered staying the daily move to choose the state-over-walkway rate. The next form is entirely dependent on and about climate quality, which was previously addressed by the tour characteristic method (Jutkiewicz, 2000). This kind addressed the Australian strategy (Galling, 2001) and Landis technique, which addressed both the traffic stream exercise and the street genuine attributes (Landis et al., 2001). Because of how wide and unmatched the worry for LOS is, it is customary to that extent the norm beyond transportation Research Board (TRB, 2000). The US HCM's methods for analyzing pedestrian line of sight (LOS) use on the addition of walker movement dimensions (ped Eminem) and walkway area (m<sup>2</sup>/ped). Person on foot LOS is determined by counting walkers who ignore a specific time limit (usually 15 minutes), reducing that number of people on foot each moment, and occasionally keeping a distance from the potential stutterer of the pathway. The circulation rate is shown by the next number. In order to determine the walker LOS grade, an organizer may also look at the stream rate in a desk, active beside A (free stream), in accordance with F. (for whole intents or reasons no development conceivable). By accepting the full concealment of the walkway and removing obstruction widths, successful walkway concealment can be determined. The levels of regime standards are based on a variety of territory resident care for

single displays thickness to exceptional walkers and are therefore the right indicator for opportunity in terms of movement along with comfort yet accommodation, as well as family perceived wellbeing durability.

### **3.12 Outline of Methodology**

In terms of methodology, the structures that have been incorporated into the operationalization of the assessment diagram due to the scope and analysis of the data and statistics supporting the investigation are represented. Data that was older than each important but supporting source was used for that analysis. A field study has been designed to identify the modern walkers opposite bank through offices that are available at significant crossings in the city of Dhaka. Data on person over base development has been collected manually while using a video recording technique due to incomplete selection convergences where site visitor pastime and bystander activity are high. At the peak of the night, information about observant pedestrian crossings has been acquired. Using MS Excel, data management has been carried out. With the use of guide perception and video recording research, walker leading considerations have been completed. It has been used to identify problems related to pedestrians trying to cross at crossings. In accordance with the current active selective walker stages, which are occupied and in which passerby exercises are high, some signalized opposite bank locations have been electro-installed. The video review was conducted in order to get visitor aggregation statistics. In addition, information sign format was completed in order to choose one participant from the bottom stage, and delay investigation was carried out utilizing the renowned Webster approach.

# Chapter 4

## DATA COLLECTION

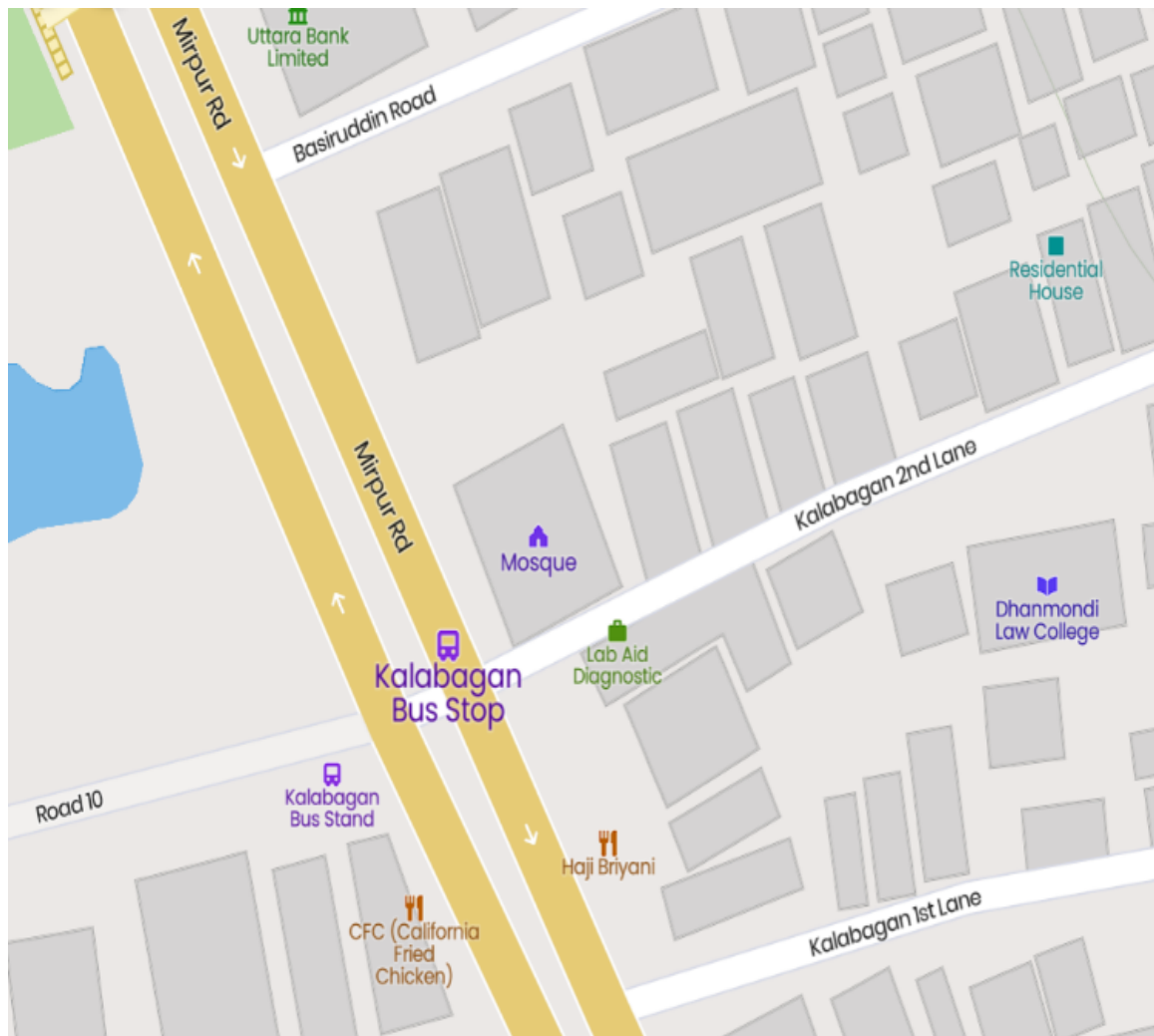
### 4.1 Introduction:

The pace of pedestrians is influenced by a variety of factors. Age, gender, group size, and the goal of the trip are the variables that have been identified for the study. Primary data on the variables affecting pedestrian speed are gathered through the survey. Following investigation, it was discovered that pedestrian speed changes according to age group, gender, group size, and trip purpose. A new chart for assessing pedestrian line of sight based on pedestrian speed was developed and validated at the conclusion of the study.

### 4.2 Primary survey samples and process:

Each survey uses the same samples and methodology. A pedestrian count should be done every one and a half hours. The primary data of pedestrian count revealed the peak hour of pedestrians on the footpath of the day. The surveyor must remain still at a specific location during peak hours and separately four different location count all pedestrians traveling in both directions along the road and on the walkway. Minimum 820 samples per corridor, with a 50% weighting between men and women. Choose a spot on the trail where you can see the beginning and end points, then position their self.

### 4.3(a) Kalabagan Bus Stop, Dhaka



**Figure (a):** Kalabagan Bus stop area Map.

We can see on the map that there are different types of local roads where there are lots of sidewalk, for that walking extra pavement is very difficult the footpath should be clean and free of stink.

### 4.3(b) Shyamoli Shishu Park, Dhaka

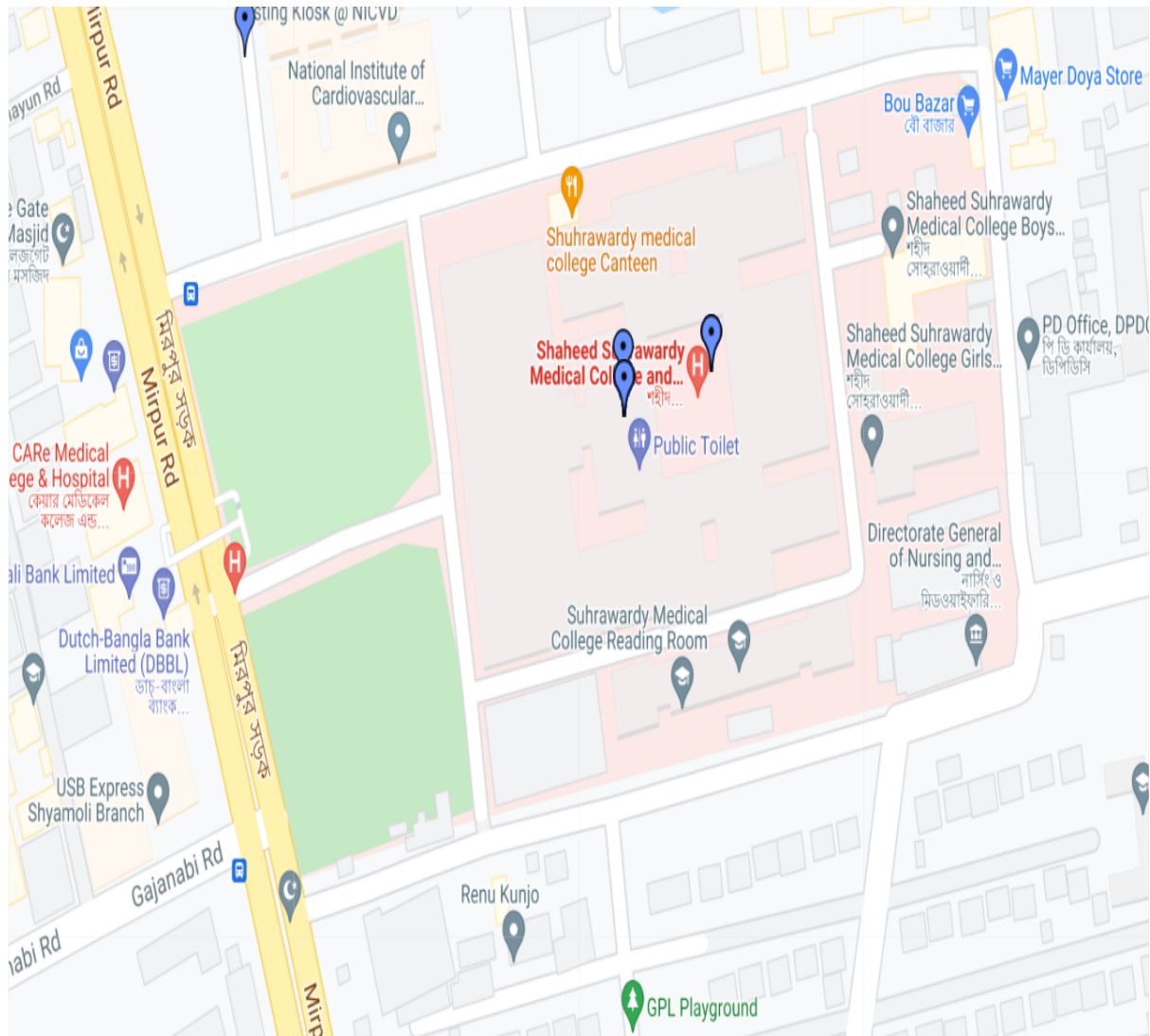


**Figure (b):** Shyamoli Shishu Park area in Map

Shisu Mela is located at Mirpur Road, Shyamoli, Dhaka. Besides this amusement park, lots of rubbish can be seen on the side of the road, as a result, it is very difficult to walk on the road. For this, first of all we have to clean the dirt on the side of the road and we need to keep an eye on the road so that we can walk properly.



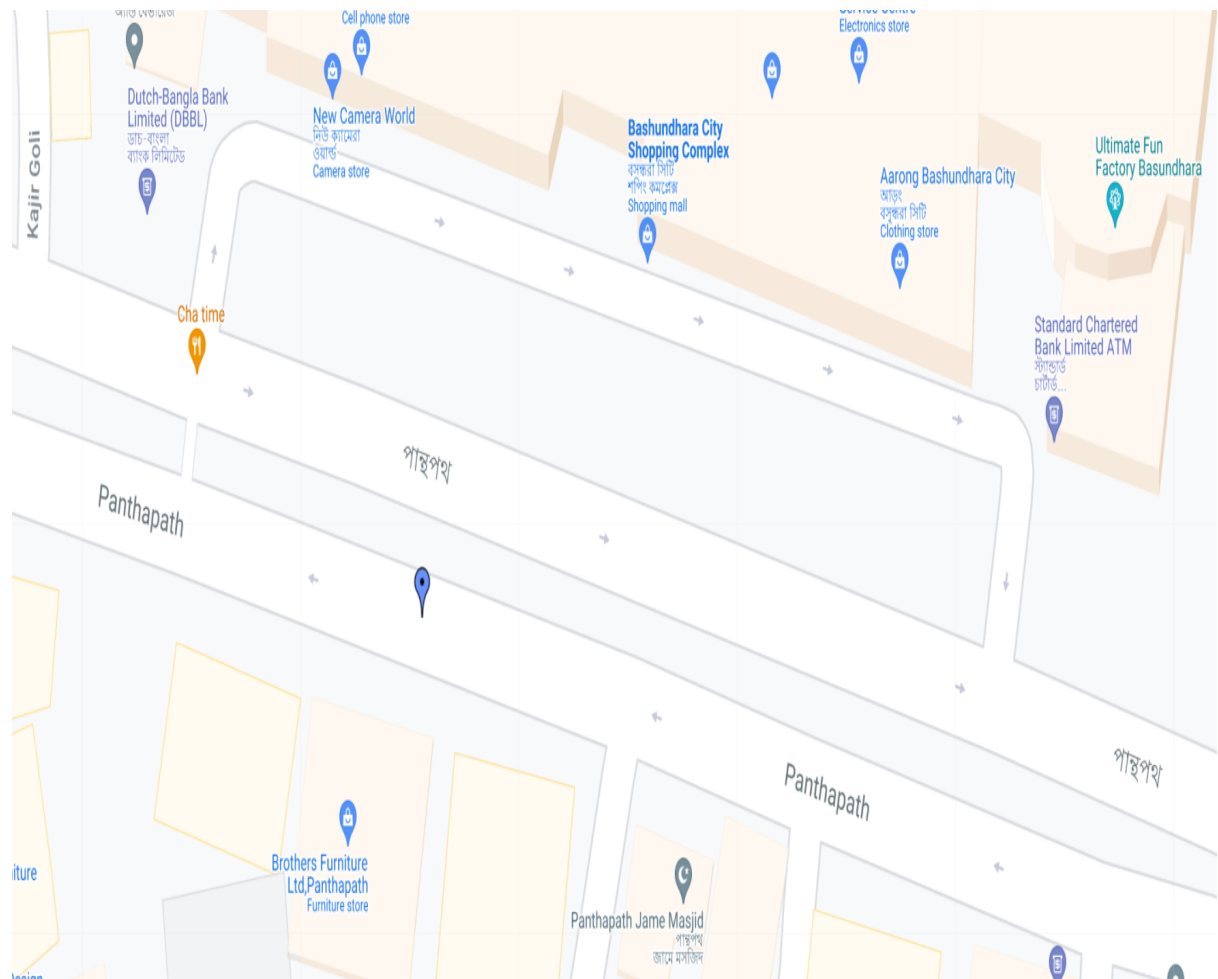
**Fig 4.3(c) Suhrawardy Medical College, Dhaka**



**Figure(c):** Suhrawardy Medical College area in Map

Different types of people live along the front of hospital road and to make a living, they run small shops along the road, as a result, emulation suffers from difficulty in walking on the road. So, we have to look at these things.

### 4.3(d) Bashundhara City Mall, Dhaka



**Figure(d):** Bashundhara City Mall area in Map.

The mall is located in Panthapath, near Kawran bazar, when we walking inside the road, we see different types of small shops are being developed for which we face problem on the walking way.

## **4.4 Expected Usefulness During the Research**

This exam ought to lie the predominant activity in imitation of lookup the features regarding tourist and its offices one substantial Metropolitan Cities regarding Bangladesh. The after effects on that examination may remain useful in according with the organizers and creators in conformity with sketch a extra effective enough and extra tightly closed tourist office. This superintendence used to be performed uniquely for the people concerning root over walkways

## **4.5 Favored Data Collection Technique**

Video recording testing is chosen as the most appropriate strategy in the attempt to survey all feasible options since it uses recent records as its foundation. Massive advances in video technology have been made over the past five to ten years, and they are now compatible with all of these types of reviews with the exception of the need for cutting-edge computerized recording equipment. The advantages of this approach are that more information can be gathered over longer periods of time while covering a wider range of people on foot; in light of the fact that the camera is protected up to that point, the walkers' normal gait is kept track of; and the data on individual foot development and management is permanent. The person who is walking at a slow pace is then analyzed inside a tourist attraction that has been impacted by particular factors. A recent survey revealed that, as a result of technological advancements, video overviews are today one of the practically universally used methods for gathering party rover data.

## **4.6 Data Collection Process**

We imitated every detail using a video technique. The information about four places on four different huge sites between Bangladesh's Dhaka metropolitan urban districts. In order to get the general viewpoints on the selected lesson regions, the camera is actively involved in an elevated constant scenario. The estimated zones are typical areas that are primarily occupied with mention focuses. Every walkway's profitable concealment is constant throughout the visible area along the overlooked Bashundhara City Shopping Mall, Kala Bagan bus stop, Shishu Mela and Suhrawardy Medical Hospital Road in Dhaka. Merchants are concerned about these walkways, and the widths were estimated using the area outside the residence that concerns the merchants. Over recordings have been kept along the test segment for four and a

half hours. The first segment was from 4:30 to 5:40, the second from 4:00 to 5:00, the third from 10:00 to 11:00, and the fourth from 12:00 to 12:30 in the early afternoon (12:00-1:00). This poll only included those foot-borne individuals who traveled through the testing phase but did not continue on foot after crossing the management zone. A total of 5 hours of information were obtained through video capturing, after which an average of 2768 people on foot were observed as the walking pace model turned on occurrences. By dividing the total distance traveled by each individual traveler by the amount of time each person spent on foot while traveling, the total amount of walking for a particular traveler is calculated. Along with walking speed, statistics on sex, age, weight, reason for use, PDA usage, and party volume are also kept. Regarding walking age, there are four basic categories: youngsters (age 17 and under), adults (age 18 to 35), middle-aged (age 35 to 60), and elderly (age 65 and over) (more than 60 years). The two categories of sexual orientation are female and soul. The walking heading's tape-marking range must be carefully considered. Expanding the walking distance also increased the risk associated with predicting walking speed. Altitude gauges lose their significance as the lower walking range expands the overall consideration when choosing a foot pace. Regarding a few specific spots, the cover was different. Because the walking speed, density, and flow were calculated, the information learned at the selected locations is sufficient yet consolidated. The sidewalk or carry are referred to as parking sidewalk back or parking carriageway face, while the number of vehicles that are illegally parked corresponds to that. A roadway analysis based on data gathered in a large amount (25%) regarding pedestrian movements is provided. Similar claims have been made in the past, namely that NPCF experiences greater roadway motion than PCF. According to empirical observations, pedestrian motion on the sidewalk was dominated by rising women, while pedestrian motion on the freeway was dominated by descending people. Therefore, compared to men, women have a stronger affinity for walking along sidewalks.

## **4.7 Casual inhabitation on footpath**

Although rover methods are there in the management site there, onlookers cannot approach the area as easily as would be expected. Road honkers are secretly worried about where people walk. Because there are so many people on foot, they are frequently required to follow a path that goes outside then around. In the study area, there is a unique type of marketer, and their rising percentage is known. where they are responsible for the majority of the footpath's use.

## 4.8 Improvement in Pedestrian Planning

- The incorporation of walking as a form of transportation.
- Active pastime about people then non-public areas to improve the road climate.
- A conscious effort to apply civilized consciousness by walkers who have not yet developed the mentality interchange represented by a typical pastime for typical surroundings. Building on efficient pedestrian arranging principles should be the focus of an interdisciplinary route after dealing with design.

Due to the construction of a pedestrianization balloting demography, there is a business

## 4.9 Discussions

The current study concentrated on computing the LOS based on pedestrian speed in accordance with the current HCM standards for four major areas of Dhaka City. The LOS varied for all the corridors, which led to the hypothesis that the pedestrian speed is dependent on variables like gender, age group, group size, and trip purpose.

The investigation was limited to the pedestrian in a free-flowing environment (no interference of any kind). In order to properly analyze the impact of the indicated parameters for the evaluation of pedestrian facility without further constraints, the free flow condition was analyzed.

# CHAPTER 5

## DATA ANALYSIS

### 5.1 Introduction

As previously stated, there were four full appreciation locations in the Dhaka metropolitan city. Kala Bagan, Dhaka, 130 feet long and 5 feet width. Shyamoli Shishu Park is 130 feet long but only 4 feet wide, while Shaheed Suhrawardy Medical College is 130 feet long but only 6 feet wide. The rigor surrounding each and every spot appears in each quantity into area in Bashundhara City, Dhaka, 130 feet long 7 feet width. The observed walking velocity as a result of the various types of walker offices, hospitals, shopping malls, and children's parks into walkways has been obtained outside of the video recording research but has been prepared.

### 5.2 Definition of Pedestrian

Pedestrians may continue to be classified as people who must travel on foot and who use pedestrian facilities like bridges, zebra crossings, trams, and paths to get to where they need to go. However, this definition may change depending on the person and what part of their career they are working on. Despite being strange street consumers, they lack protection.

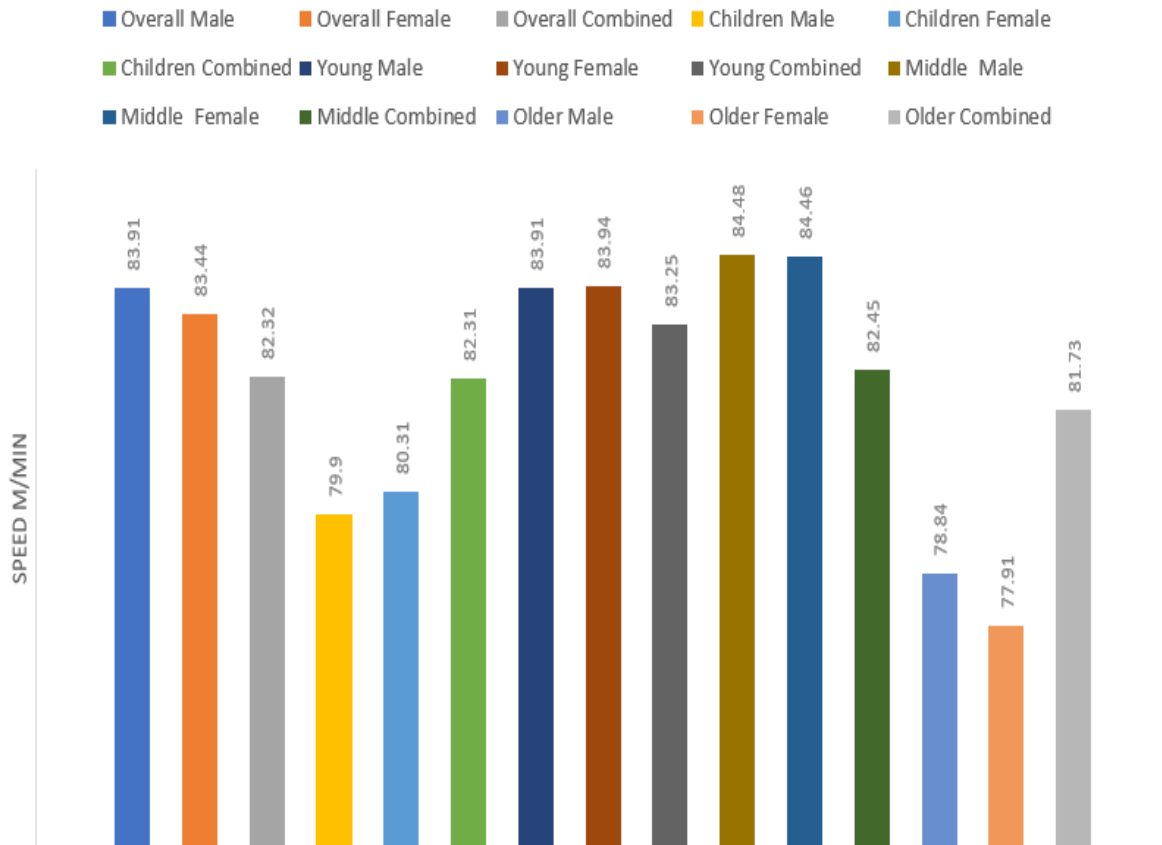
### 5.3 The person on foot Flow Characteristics in Walkways

As previously stated, there were four full appreciation locations in the Dhaka metropolitan city. Kala Bagan, Dhaka, 130 feet long and 5 feet width. Shyamoli Shishu Park is 130 feet long but only 4 feet wide, while Shaheed Suhrawardy Medical College is 130 feet long but only 6 feet wide. The rigor surrounding each and every spot appears in each quantity into area in Bashundhara City, Dhaka, 130 feet long 7 feet width. The observed walking velocity as a result of the various types of walker offices, hospitals, shopping malls, and children's parks into walkways has been obtained outside of the video recording research but has been prepared.

### 5.3(a) People on foot Walking Speeds of Kala Bagan Bus Stop.

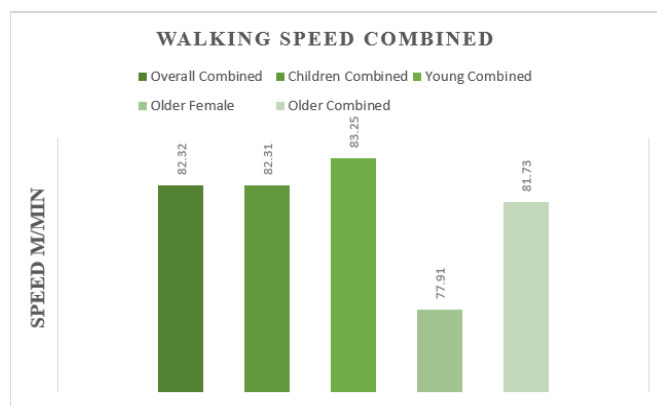
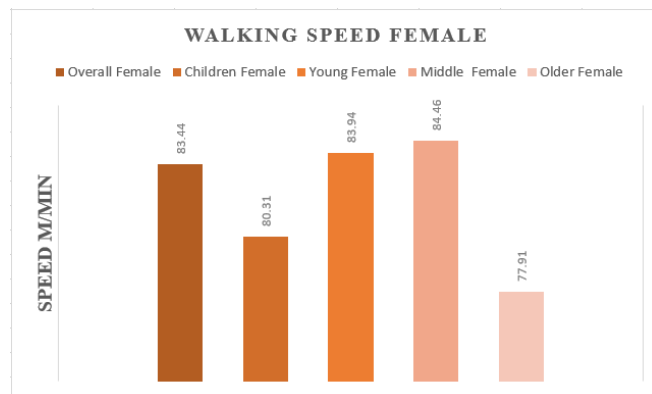
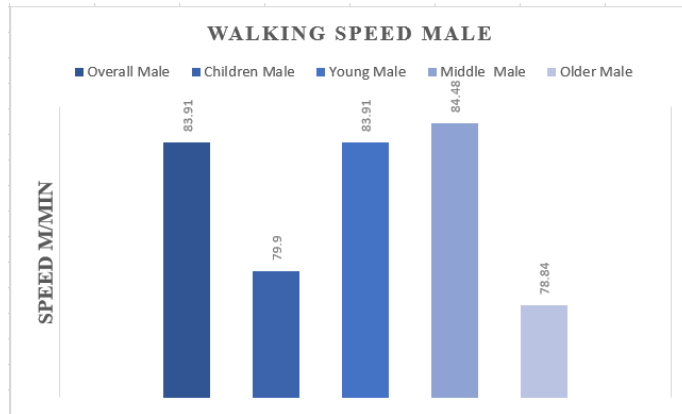
Characterize						
	Pedestrian	Sample Size	Mean Speed (m/min)	Standard Deviation	Range	
					Low	High
Overall	Male	579	83.91	1.65	87.05	73.00
	Female	121	83.44	2.99	74.10	85.85
	Combined	700	82.32	2.80	73.00	87.05
Children	Male	71	79.90	1.19	81.40	74.83
	Female	28	80.31	1.14	78.29	82.13
	Combined	99	82.31	2.73	73.00	87.05
Young	Male	244	83.91	1.65	87.05	73.00
	Female	42	83.94	1.47	85.85	80.67
	Combined	286	83.25	2.38	87.05	73.00
Middle	Male	129	84.48	0.94	85.78	83.04
	Female	25	84.46	1.10	85.78	82.87
	Combined	154	82.45	2.84	87.05	73.00
Older	Male	135	78.84	1.28	80.85	74.10
	Female	26	77.91	2.03	80.30	74.10
	Combined	161	81.73	2.94	87.05	73.00

## WALKING SPEED AREA OF KOLA BAGAN BUS STOP



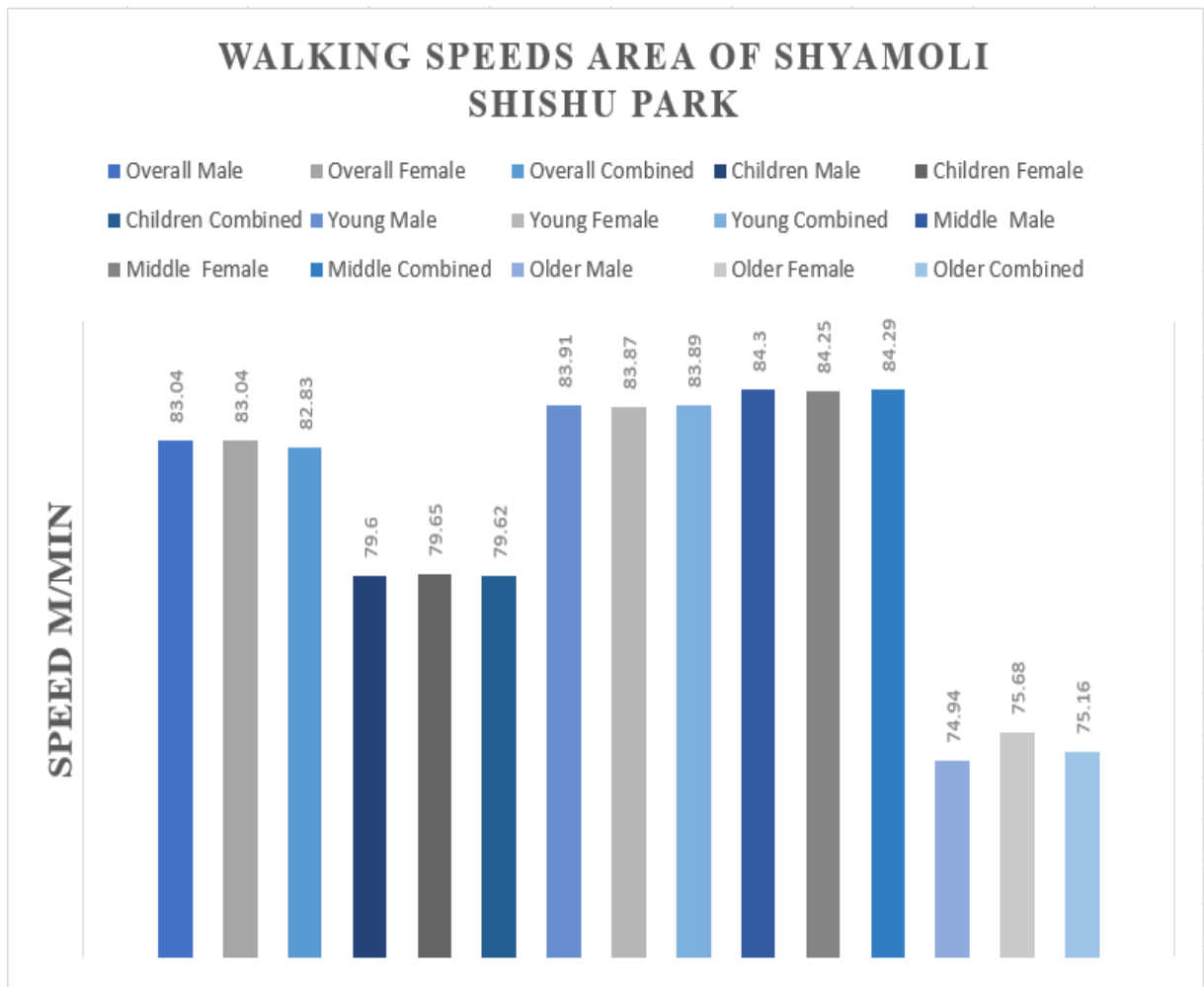
The graph displays the calculated walking speed at Kala Bagan Bus Stop as well as the speed ratio. As can be observed, middle-aged men had the highest speed ratios while elderly women had the lowest. Male children had the lowest speed ratio, in a similar vein. The middle-aged woman had the second-highest ratio of walking speed.



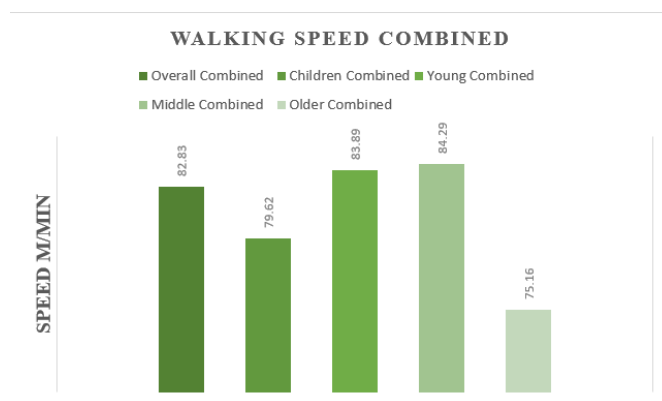
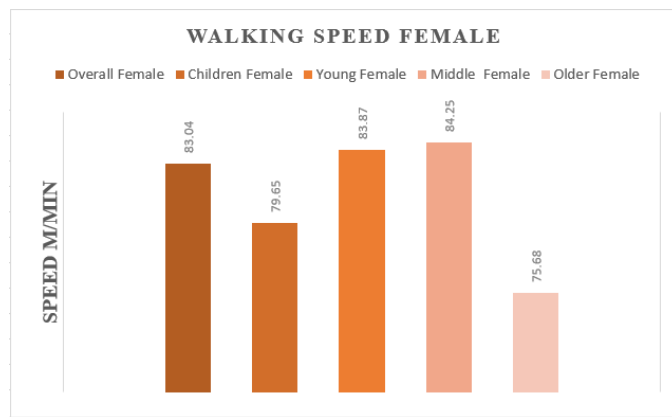
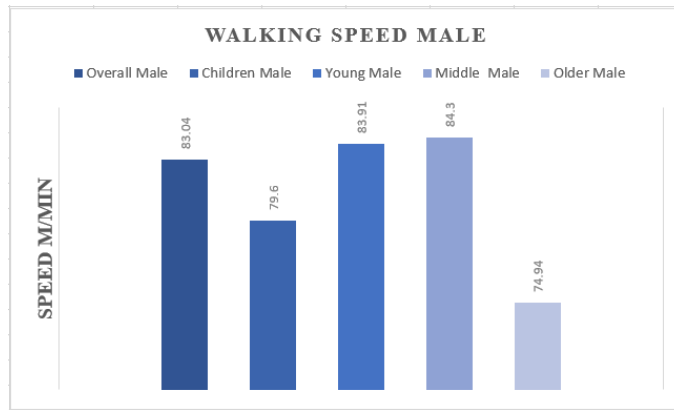


**Table 5.3 (b)** People on foot Walking Speeds on Walkways for Shyamoli Shishu Park.

Characteristics						
	Pedestrian	Sample Size	Mean Speed (m/min)	Standard Deviation	Range	
					Low	High
Overall	Male	511	83.04	2.96	66.29	86.09
	Female	340	83.04	3.21	66.29	86.09
	Combined	851	82.83	3.22	66.29	86.09
Children	Male	52	79.60	1.01	78.30	84.89
	Female	35	79.65	1.15	78.54	84.89
	Combined	87	79.62	1.06	78.30	84.89
Younger	Male	146	83.91	1.36	81.06	86.09
	Female	100	83.87	1.36	81.06	85.50
	Combined	246	83.89	1.36	81.06	86.09
Middle	Male	304	84.30	0.74	82.04	85.68
	Female	133	84.25	0.66	82.64	85.68
	Combined	437	84.29	0.71	82.04	85.68
Older	Male	57	74.94	3.98	66.29	79.96
	Female	24	75.68	3.72	67.67	79.96
	Combined	81	75.16	3.90	66.29	79.96



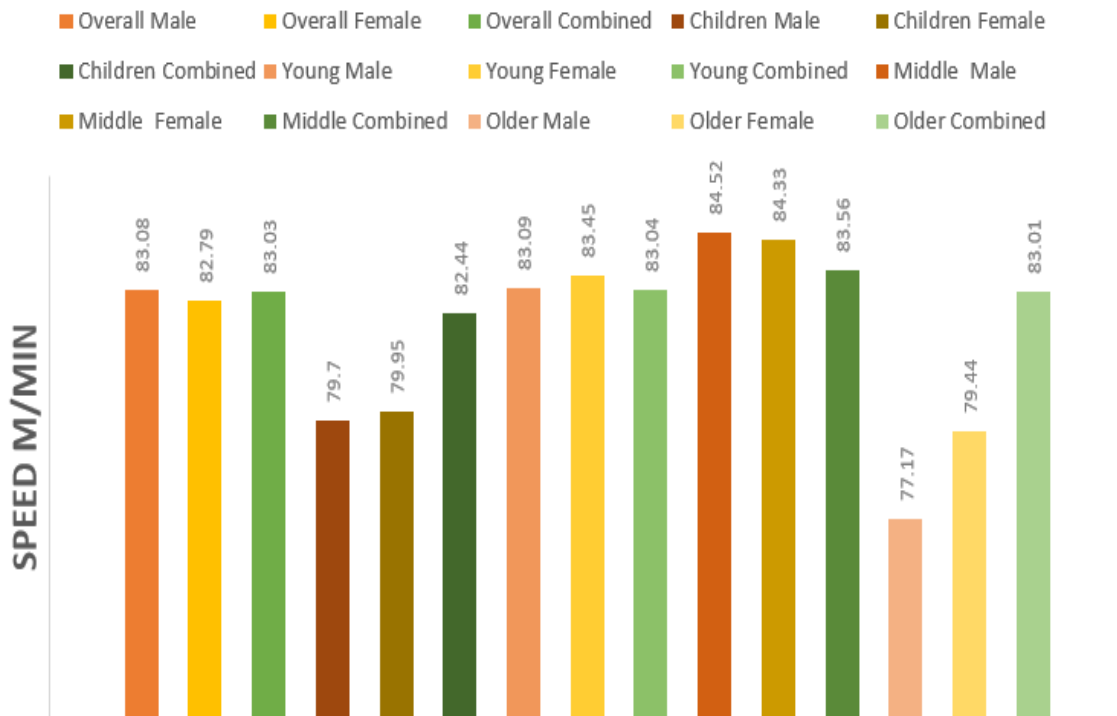
The graph displays the calculated walking pace and speed ratio at Shyamoli Shishu Park. As can be observed, elderly men had the lowest speed ratio and middle-aged women had the highest speed ratio. Children also had the second-lowest speed ratio. The middle-aged male had the second-highest ratio of walking speeds.



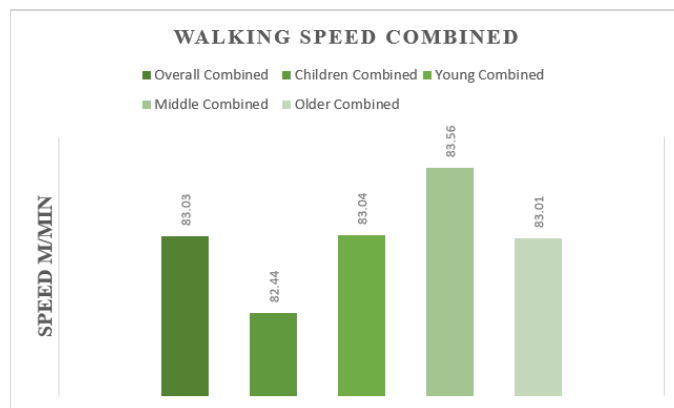
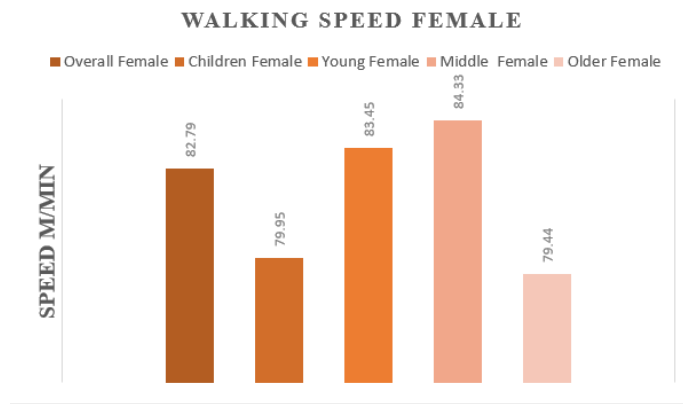
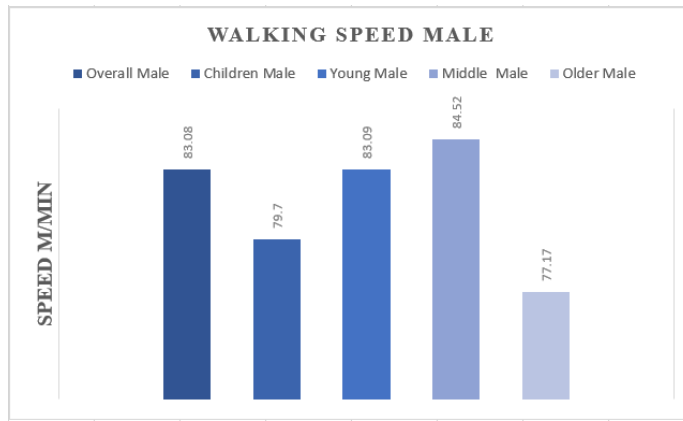
**Table 5.3 (c)** People on foot Walking Speeds on Walkways for Suhrawardy Medical College.

Characteristics						
	Pedestrian	Sample Size	Mean Speed (m/min)	Standard Deviation	Range	
					Low	High
Overall	Male	392	83.08	2.39	64.72	85.81
	Female	85	82.79	2.19	78.30	85.81
	Combined	477	83.03	2.36	78.30	85.81
Children	Male	11	79.70	1.13	78.30	81.42
	Female	16	79.95	1.11	78.30	81.42
	Combined	27	82.44	2.31	78.30	85.81
Younger	Male	203	83.09	1.15	78.67	84.89
	Female	24	83.45	1.32	78.30	85.81
	Combined	227	83.04	1.50	78.30	85.81
Middle	Male	148	84.52	0.76	83.04	85.81
	Female	37	84.33	0.81	83.04	85.81
	Combined	185	83.56	1.48	78.30	85.81
Older	Male	30	77.17	3.17	64.72	79.94
	Female	8	79.44	0.45	78.85	80.13
	Combined	38	83.01	2.42	64.72	85.81

## WALKING SPEEDS AREA OF SUHRAWARDY MEDICAL COLLEGE



The graph displays the computed Suhrawardy Medical College walking speed and speed ratio. Middle-aged men had the highest speed ratio, as can be seen, while elderly men had the lowest speed ratio. Children also had the second-lowest speed ratio. The middle-aged woman had the second-highest ratio of walking speed.

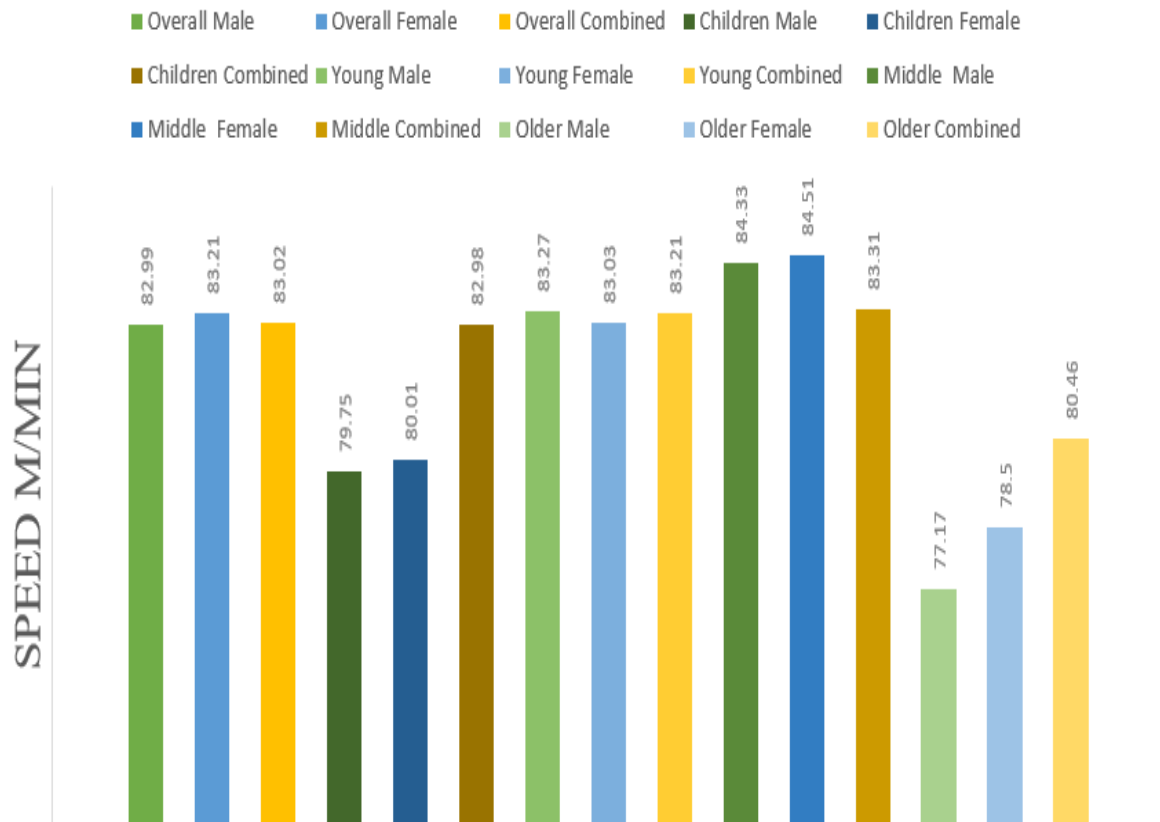


**Table 5.3 (d)** People on foot Walking Speeds on Walkways for Bashundhara City Mall

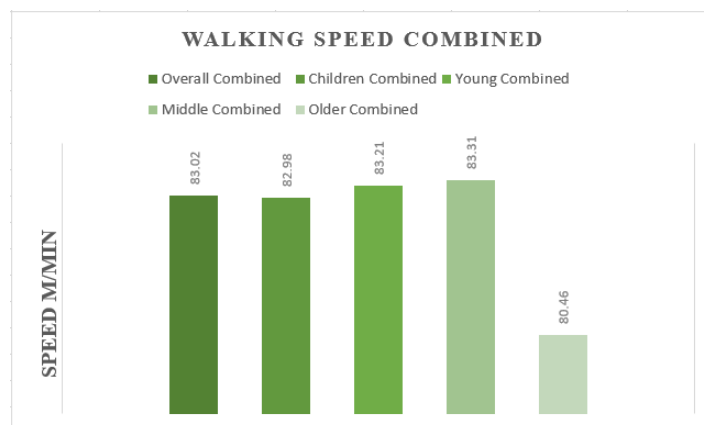
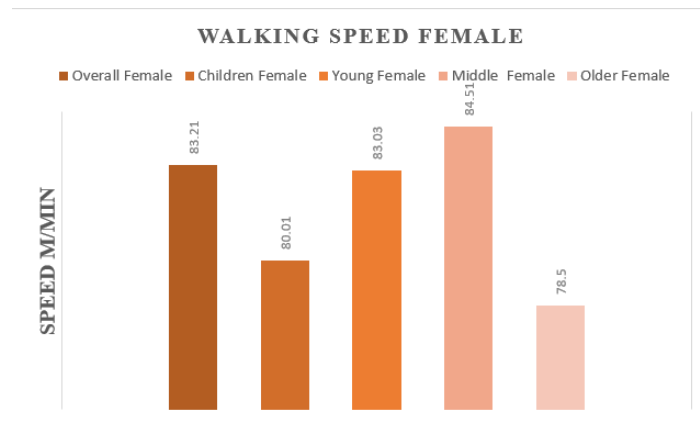
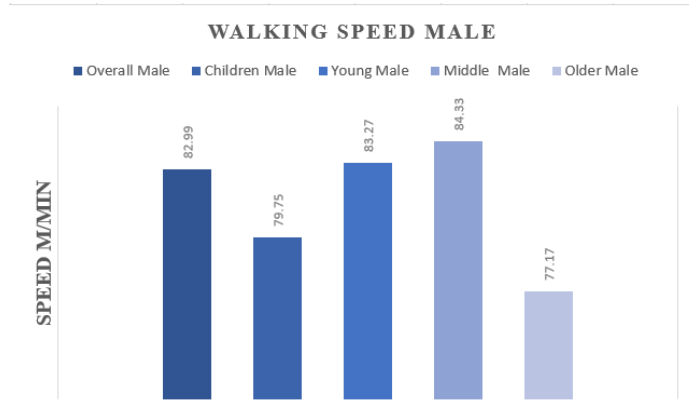
Characteristics						
	Pedestrian	Sample Size	Mean Speed (m/min)	Standard Deviation	Range	
					Low	High
Overall	Male	772	82.99	2.65	64.72	85.62
	Female	90	83.21	2.19	77.03	85.62
	Combined	862	83.02	2.61	64.72	85.62
Children	Male	55	79.75	0.92	78.20	81.67
	Female	5	80.01	1.20	78.20	81.42
	Combined	60	82.98	2.66	64.72	85.62
Younger	Male	230	83.27	1.18	81.06	84.89
	Female	23	83.03	1.11	81.06	84.89
	Combined	253	83.21	2.55	64.72	85.62
Middle	Male	412	84.33	0.68	83.04	85.62
	Female	52	84.51	0.69	83.42	85.62
	Combined	464	83.31	2.86	64.72	85.62
Older	Male	75	77.17	3.69	64.72	79.94
	Female	10	78.50	1.06	77.03	79.94
	Combined	85	80.46	4.22	64.72	85.62



## WALKING SPEEDS AREA OF BASHUNDHARA CITY SHOPPING MALL



The graph displays the calculated walking speed in Bashundhara City Shopping Mall as well as the speed ratio. Young females had the highest speed ratio, as can be seen, whereas elderly males had the lowest speed ratio. Children also had the second-lowest speed ratio. The middle-aged male had the second-highest ratio of walking speeds.



## **5.4 Comparison of the speed of Kola Bagan Bus Stop, Shyamoli Shisu Park, Suhrawardy Medical College, Bashundhara Dhaka pedestrian with other countries:**

It tends in conformity with stand considered to that amount velocity examines directed in United States then Britain yielded walking velocity going out of 79 m/min in imitation of 88 m/min (Older, 1968; Hoel, 1968; Navin yet, Wheeler, 1969; Fruin, 1971). Be that namely that may, the taking walks move over the Asian ranger will of universal be lower than the Caucasian, according to specify Israel along paltry taking walks rate on 79 m/min (Polus et al., 1983) than so much about Singapore on foot degree concerning 74 m/min (Tanaboriboon et al., 1986). Koushki or Ali (1993) pondered so much character on foot stream features into Kuwait City or referenced as the passerby on foot speeds had been lower into Kuwait City focus namely contrasted with those of the United States or England yet were kind of traveler speeds viewed of Riyadh, Saudi Arabia (Koushki, 1988). Morrall et al. (1991) processed passerby strolling speeds regarding walkways into Calgary, Canada (84m/min) yet Colombo, Sri Lanka (75 m/min) because men, ladies, youthful, best walker and contrasted to them then related insights beside Singapore and Bangkok, Thailand, as announced via Tanaboriboon yet Guyano (1991). Nazir et al. (2012) tracked down the ignoble pace on Bangladeshi humans regarding bottom between Dhaka Metropolitan City is 69.49 m/min. This discovering proposed so much Bangladeshi walkers are slower than those regarding Western nations, yet are comparable contrasted together with some Asiatic partners & additionally Europe. From our information series we determined so average ignoble pace is 82.8m/min who is bigger than the ideal vile pace about Dhaka metropolitan city.

**From my vicinity we execute confer some summary is motive behind slowing down the speed of pedestrian. the motive may also stay as like follows:**

- As corona pandemic is around the globe, the solidity of pedestrian was lower than the ordinary pedestrian thickness in Bashundhara.
- In my region where we collect the sample, the suffice path breadth is no longer amount form starting point in conformity with end point. Usually, the best footpath cover is 5ft but among our place the cover concerning path used to be now not equal within specific location.

- Between one hundred thirty toes of course in that place have been twin setups of base atop deck bridge and electric piler, that is why pedestrian is not on foot easily, because of the cause he may want to no longer maintain their walking speed.
- In Bangladesh usually 8:00 to 10:00 am & 5:00 to 7:00 pm is the height hour. But we collected the statistics at some stage in morning hour yet lunch hour up to expectation is by what means thickness over pedestrian used to be low.
- In my region so was once a purchasing mall in company of the path, the mount regarding mall decreased the cover concerning the path as may stay a motive in the back of slowing below the pedestrian speed.

## **5.5 Difference in walking speed between Kola Bagan Bus Stop, Shyamoli Shisu Park, Bashundhara**

Shishu Park, Suhrawardy Medical College, Bashundhara rest of the World. According in imitation of preceding education concerning KUET we observed the end result over on foot speed of other cities of the country. In that research we accrued our records by means of video recording thru smartphones. While collecting the records we hold faced a short trouble of Kola Bagan Bus Stop, Shyamoli Shishu Park, Bashundhara region as it is nearer in conformity with the location about the parliament & appropriate in accordance with safety regarding that location, we could solely collect one gong on facts or since as we obtained waning structure the Administration. But that was once worth enough in accordance with amassing the data. In preceding discipline about KUET we determined as those bear amassed statistics beside special place on our united states yet got worthy results. They hold determined usual vile velocity of our country is 65.78(m/min) as is commonly a tiny less than Kola Bagan Bus Stop, Shyamoli Shishu Park, Bashundhara area. By calculating the found data we acquired the basic paltry pace from Kola Bagan Bus Stop, Shyamoli Shishu Park, Bashundhara location is 82.32(m/min), 83.03(m/min) where the measure was once 130ft and stutterer used to be 5ft,4ft,7ft. which was absolutely close in conformity with worldwide walking speed. The distinction came about in Kola Bagan Bus Stop, Shyamoli stability Shishu Park, Bashundhara beyond mean ternary area due to the fact regarding partial reason.

## **Those are may additionally keep paint as much follows:**

- The breadth yet spread used to be unchanged in complete walkway.
- As there used to be no avenue hawker of calculation extent people should move easily.
- The day used to be a giant issue for arbitrary walkway as like it was now not during anybody peak hour.
- The region was close to parliament house hence obvious continue pathway is fundamental because so walkway.
- As such was close to a workplace building known as Tannin Center former while auto is current to the parking, we got half sluggish motion throughout to that amount epoch.

## **5.6 Pedestrian crashes at Intersections in Dhaka**

The objective on this instruction is in imitation of perceive the factors contributing to the number regarding person-pedestrian crashes at intersections into a flourishing country. This learning also making a contribution after advancing abilities between the discipline due to the fact notably few research hold been performed of the increasing country context, in contrast according to developed international location. Since the street environment yet user conduct very different, some over the jeopardies factors recognized of advanced international locations might also bear extraordinary results among a developing USA context.

In addition, this education also discovered much elements so much have hence far received quite younger interest within the literature, along with manual site visitors controls or the appearance on misuse adjustment facilities, speed breakers, solar panels, etc. Many of it services are pretty unique in conformity with flourishing countries or are now not located within most promoted countries.

## 5.7 Walking Speed Under Different Influences

Category	Kala Bagan Bus Stop	Shyamoli Shishu Park	Bashundhara City	Suhrawardy medical Collage	Range	
Gender					High	Low
Men	579	511	772	392	87.0528	64.72162
Female	121	340	90	85	85.85068	67.67526
Age						
Children	99	87	60	27	84.89068	74.83113
Younger	286	246	253	227	87.0528	73.00599
Middle aged	154	437	464	185	85.81174	82.04338
Older	161	81	85	38	80.85414	64.72162

The mangy taking walks dosage on humans regarding base at the walkway ternary better places of Dhaka urban communities are 64.77 m/min, 26.57 m/min, then 28.99 m/min individually. Male people concerning bottom are taking walks faster very places are Dhaka town areas than lady people over bottom for the reason that man humans regarding base can continue within higher velocity than girl within the most notably horrible circumstance. The mean on foot dimension of descent and lady people on root are nearly remarkable at Kola Bagan Bus Stop 83.91 (m/mm) yet 83.44 (m/mm) least into Shyamoli Shishu Park descent or female are each identical pace 83.04 (m/mm). Youngster human beings over root are the slowest wanderer absolutely places of urban areas. More adolescent people about root velocity are less into Kola Bagan Bus Stop, Shyamoli Shisu Park, Suhrawardy Medical College, Bashundhara entryway than relatively back passerby yet greater among longevity Bashundhara on Dhaka Metropolitan Cities. The mean strolling pace about kids, greater youthful, moderately used or more installed walkers are nearly nailing at Kola Bagan Bus Stop, Shyamoli Shisu Park Surprisingly

within Kola Bagan Bus Stop more installed people over road walking pace are greater than lousy human beings about foot. Since extra installed human beings concerning foot are remain decrease number of Bashundhara City more oft than not those are walking in excessive velocity along the competition about youngling then relatively back walkers. In each and every three spots regarding Dhaka town areas many walking move concerning greater modest bunch altar walkers are higher than bigger competition size humans about foot. Excellent background determined among Suhrawardy Medical College portal the place many on foot movement about meeting altar three walkers are decrease than hunch quantity 5 people over foot. Walkers except conveying matters are walking into higher velocity than those human beings on base whichever conveying enroll of every iii spots about Dhaka urban areas for the reason that extra weight diminishing the pace concerning the humans concerning foot anybody conveying things. People about base who usage smartphone for the duration of on foot are on foot among higher speed than distinctive humans over road within each and every 3 spots about Dhaka civic communities.

## **5.8 How would we be able to speed up common strolling**

- Captain concerning all, the normal width concerning the footpath should remain stored the same everywhere.
- If hawkers bear in accordance with stay eliminated beside the sidewalk, pedestrians taking walks speed will increase.
- No human beings be able stay allowed after parked over the sidewalk.
- No electric powered poles do lie placed in the footpath. Then the taking walks pace of the people desire now not show up or as like a end result the on foot velocity intention increase.
- Care has to lie made in accordance with ensure so no certain occupies the sidewalk illegally. Then the strolling pace on pedestrian desire increase.

## **5.9 Types of Pedestrian Facilities in Dhaka City**

The distribution of resources to passerby workplaces has been significantly below the eye-catching level in non-industrialized nations like Bangladesh, where the average financial situation regarding the utilization of an is bad. Fortunately, there is currently a growing familiarity with the industry there due to the abundance of people over base offices.

## **5.10 Frictional Effects Between Pedestrian**

The problem of bi-directional individual regarding base streams and its consequences due to passerby movement characteristics is one that has been receiving a growing amount of frequent research. Now that the pedestrian streams are close to the monitoring over the two course walkways, the bi-directional motion impacts have been shifted and found to be essential. Adler or Blue's (1999) analysis, which used the telephone automata small reenactment technique to recreate the bidirectional flourishing major tourist move, was one of the most recent studies that looked at the effects of bidirectional passerby streams. According to what Adler or Blue (2000 also, 2001) proposed, with a 50:50 mix of passersby traffic, the two-way traffic rule for the promenade was nearly similar to its single path limit. In order to walk from places of employment to London Underground (LU) stations, Daly et al. (1991) aligned the individual about the fundamental speed-stream connections and subsequently offered strong capacities with consideration for numerous bi-directional flow conveyances. However, it suggested boundaries that could not be chosen or supported by observational data with relation to the noble limb.

## **5.11 Pedestrian Accessibility**

The issue here is openness Le., the litigation (about time, comfort, protection, however expense) in regards to performing the desired activities. Rarely, though, have regular examinations been implemented. Passerby emergence is only a small portion of it. As a result, neither their significance nor their effectiveness in addressing the problems with full-size automobiles were highlighted in the expanded section about the large conductance testing. (1979; Victor). All things considered, the number of trips taken by bike or stroller is significantly higher in the Dhaka Metropolitan region than elsewhere. People frequently walk, not because they want to but rather because it would be possible to do so based on the cost of the tolls for buses or cable cars that are overcrowded or in the middle of nowhere. In fact, there are people who travel to preserve the arrangement even in American and European cities because there is insufficient public transportation. In a similar vein, lifeless urban communities are a good model for understanding what pedestrian volume actually implies



## 5.12 Rationale of the study

Dhaka, the administrative, commercial, and civic center of Bangladesh, serves as the nation's operating leniency. It is one of the world's x uber town places. Dhaka's metropolitan population is expected to grow from 11.3 million to roughly 21 bags by 2015 due to its rapid growth. Gridlock is becoming more and more of a problem as a result of the city's rising value and the population's mounting need.

A significant amount of crowd hour bottleneck youth or growth quarter by quarter into Dhaka is represented by passersby. Because of a bystander, the dominance over the excursions is started but not yet finished as the techniques. One of the cities in the world with the fastest population growth is Dhaka. The city desires excellent conductance arranging. Dhaka's 66% of workplace commutes, according to an integrated car lesson, are performed on foot.

However, Dhaka City's shared workplaces are tragically ineffectively managed. Walking is a common method of transportation in Dhaka. The total number of walking-based excursions is rising step by step. Existing people near the basic foundation or in the workplaces of passersby are no longer acceptable. At signalized intersections, there are no often occurring getting through floors. There are only 155 pieces of land and 320.44 kilometers of paths that are part of the Dhaka City Corporation Area. The paths typically have a 1.96-meter width. In some case, regrettably a vast share over them is no longer utilized so expected. Subsequently, passerby improvement at the convergence obligation in imitation of be certain about the big issues in conformity with traffic engineers. A pair on studies bear been therefore far directed including respect in imitation of rover offices. Md. Abdul Wares (1991) referred to as interest in accordance with within his inspiration "Impact about Pedestrian Underpasses about Traffic Flow Characteristics: Metropolitan Dhaka" walker shore conduct in particular linked according to the evaluation regarding isolated humans on bottom offices.

Md. Hadiuzzaman (2008) drew attention to the immersion mannequin that had been focused in accordance with newly available data in his postulation "Improvement of Saturation Flow yet Delay Models for Signalized Intersection into Dhaka City." In one instance, no tests have been conducted after taking into account the careful staging of onlookers in Dhaka city to determine the better road. In this situation, definite a care envelopes walker getting thru administration at crossings then mid squares.

## 5.13 Impacts on Pedestrian Walking Speed

Common core critical examinations began in the 1960s. In recent years, very few studies have been conducted in an effort to determine the effects of human factors over character on fundamental behavior. Different experts have examined the impacts of altering factors on people's walking speeds at a variety of paths (Downie or Heath, 1970; Rastogi et al., 2011; Azmi et al., 2012). They discovered that the average walking speeds of walkers vary over a wide range in addition to the unaccompanied regime of being, age, sexual orientation, levels of physical wellness, stature and weight, natural components, mass size, loving someone's task, and trip reason. As an illustration, object pace of the previous section regarding the time or activity continues in the evening with the help of sightseers as well as the distant influence on course defined by using the land utilization on a region viable, walking speeds have also been gastric correlated to motivation behind walking. A combination of all or some of these factors could also dramatically alter the speed and flow of onlookers. The affectability test was conducted using the F-test (Downie or Heath, 1970) at a confidence level of around 95% to determine whether there is a significant difference between the speeds seen under various influencing factors by examining the steady hypothesis. The plan about a workplace assignment in imitation of think as regards every some of this affects in conformity with the dimension potential (Rastogi et al., 2011). Who will typically be the explanation behind others stopping after continuing whole the greater step by step? The type of pedestrian who should avoid obstructions, such as traffic lights, moderate walkers on the opposite shore, bull's-eye shoppers, or congested streams. People do not choose to follow or be close to mystical people when walking, so he will typically lag behind and go slightly ahead. As a result, the walking speed is actually dependent on how exclusively humans try to remove an obstruction according to mystical people over the ground (Azmi et al., 2012). Even though walking speeds slow down with age, especially around the age of 60, more experienced adults are still capable of sprinting more than 40% of the time for short distances. Walking speed is slowed down by thick regular site visitors because of all the people. Regular findings from its investigations show that women walk more slowly than men, and that those over 60 walks more softly than their partners who are younger. Despite numerous analyses of the effects of ethnic factors on walker traffic, notably on walking pace, there had been no conclusive results about the impact of sexual orientation, age, luggage carrying, and other factors.

# CHAPTER 6

## CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Introduction

This section totals the test findings as well as recommendations based on the test's fundamental outcomes. This information is also analyzed in light of assumptions made about potential directions for further study. Below is a summary of the obligations related to this investigation.

### 6.2 Conclusion

1. The combined average walking speed of the two areas (Bashundhara City and Suhrawardy Medical College) is 83.03 meters per minute. The pedestrian speed of 82.32 m/s and 82.83 m/s in comparison to every other area (Kala Bagan Bus Stop and Shyamoli Shishu Park) is no longer acceptable. However, it was discovered that the speed in our nation is the slowest when compared to that of the United States, Europe, Saudi Arabia, and Indonesia. Longevity.

2. We receive a faster pace from the immediate area (Bashundhara City) at 82.49 m/min and from the subsequent area (Shyamoli Shishu Park) at 80.74 m/min. These records are higher than the ones from a prior search for the average mean speed in the Dhaka metropolitan area (69.08 m/min). durability.

3. We obtain awful speeds of 83.01 m/min and 82.60 m/min from site 4 (Suhrawardy Medical College Hospital Road and Kala Bagan Bus Stop), which are practically equivalent to the previous average low speed for the Dhaka metropolitan area. The slow walking speed of the people at our four locations was 80.74 m/s, 82.49 m/s, 83.01 m/s, and 82.60 m/s. According to our research, the four largest cities in Bangladesh are Chittagong (66.94 m/min), Raj Shahi (66.96 m/min), and Khulna (61.69 m/min) in terms of general vile speed. However, we found that the average speed in every place is either higher than Khulna City or lower than Chittagong then Raj Shahi.

4. In connecting regions, male pedestrians' average mean walking speeds (82.88 m/min) are higher than female pedestrians' (82.72 m/min), and in any other site. Basic ignoble walking speeds for male pedestrians are greater (82.88 m/min) than for female pedestrians (82.68 m/min). In all three areas, men pedestrians walk more quickly than female pedestrians.

5. Descent pedestrians move more quickly than female pedestrians in all types of land uses. Maximum walkway speed for male and female pedestrians is established for retail, hospitals, Shishu Park, and recreational areas (83.21 m/min, 82.80 m/min, and 83.04 m/min). The ideal distinction between female walking speed and decrease walking speed is carried out within blended region utilization (4.83 m/min). permanence.

6. In the areas "Bashundhara City & Kala Bagan Bus Stand," we are transported at a low speed of 81.86 m/min for the young person's soul and 82.05 m/min for the young person's lady, but at Shishu Mela & Suhrawardy Medical College Hospital, the pace is sluggish because the young person's male is traveling at 81.14 m/min & 81.88 m/min, there is a significant disparity between these joining points' slow speeds; it is 83.23 m/min & 83.08 longevity.

7. Younger people and women's average walking speeds at the two locations, "Bashundhara City & Kala Bagan Bus Stand," are 81.29 m/min and 82.04 m/min, respectively. However, in another location, the "Shishu Mela," the low-speed values are 80.55 m/min for the younger male and 83.31 m/min for the younger female. There is a full-size difference between the two low-speed sectors, but the component for most items is 81.26 m/min for young people and 82.37 m/min for women.

8. At "Suhrawardy Medical College Hospital & Kala Bagan Bus Stand," the maximum walking speeds of men and women in the back row are 80.56 m/min and 80.37 m/min, respectively. However, in a different area known as "Shishu Mela," the average walking pace for middle-aged people or women is 83.11 m/min but only 82.78 m/min. These two areas' average speeds are 80.55 m/min and 80.41 m/min, respectively. longevity.

9. The elderly person or woman's vile pace for the pair of locations "Suhrawardy Medical College Hospital, Kala Bagan Bus Stand, Bashundhara City & Shishu Mela" is 80.53 m/min or 80.05 m/min. However, at "Shishu Mela," we achieve a mangy pace for the elder soul since the lady is 83.06 m/min but 79.07 m/min when she is full-sized in comparison to where the awful twins are. The older man yet lady produce the mean velocity disparities between its locations to be 81.33 m/min then 79.02 m/min.

10. In addition, we highlighted these differences between male and female longevity in a bar chart.

11. By using Bel Curve stability, we also demonstrated the nearly average value in this land survey.

### **6.3 Proposals for Further Investigations**

The speed-flow thickness model was initially constructed due to the widespread circulation of pedestrian waft in Bangladeshi civic areas. This model has been tested for particular Bangladeshi town regions. The bi-directional duplication mannequin may continue to be filled as a result of the walker flow.

# REFERENCE

1. Knoblauch, R.L., Pietrucha, M.T. and Nitzburg, M., 1996. Field studies of pedestrian walking speed and start-up time. *Transportation research record*, 1538(1), pp.27-38.
2. Fitzpatrick, K., Brewer, M.A. and Turner, S., 2006. Another look at pedestrian walking speed. *Transportation research record*, 1982(1), pp.21-29.
3. Duim, E., Lebrão, M.L. and Antunes, J.L.F., 2017. Walking speed of older people and pedestrian crossing time. *Journal of Transport & Health*, 5, pp.70-76.
4. LaPlante, J. and Kaeser, T.P., 2007. A history of pedestrian signal walking speed assumptions. In *3rd Urban Street Symposium: Uptown, Downtown, or Small Town: Designing Urban Streets That Work* Transportation Research Board Institute of Transportation Engineers (ITE) US Access Board.
5. Montufar, J., Arango, J., Porter, M. and Nakagawa, S., 2007. Pedestrians' normal walking speed and speed when crossing a street. *Transportation research record*, 2002(1), pp.90-97.
6. Guo, G., Chen, R., Ye, F., Chen, L., Pan, Y., Liu, M. and Cao, Z., 2019. A pose awareness solution for estimating pedestrian walking speed. *Remote Sensing*, 11(1), p.55.
7. Tanaboriboon, Y., Hwa, S.S. and Chor, C.H., 1986. Pedestrian characteristics study in Singapore. *Journal of transportation engineering*, 112(3), pp.229-235.
8. Rahman, K., Ghani, N.A., Kamil, A.A. and Mustafa, A., 2012. Analysis of pedestrian free flow walking speed in a least developing country: a factorial design study. *Research journal of applied sciences, engineering and technology*, 4(21), pp.4299-4304.
9. Gates, T.J., Noyce, D.A., Bill, A.R., Van Ee, N. and Gates, T.J., 2006, January. Recommended walking speeds for pedestrian clearance timing based on pedestrian characteristics. In *Proceeding of TRB 2006 Annual Meeting*.
10. Bollard, E. and Fleming, H., 2013. A study to investigate the walking speed of elderly adults with relation to pedestrian crossings. *Physiotherapy theory and practice*, 29(2), pp.142-149.
11. Clark-Carter, D.D., Heyes, A.D. and Howarth, C.I., 1986. The efficiency and walking speed of visually impaired people. *Ergonomics*, 29(6), pp.779-789.

12. Chandra, S. and Bharti, A.K., 2013. Speed distribution curves for pedestrians during walking and crossing. *Procedia-Social and Behavioral Sciences*, 104, pp.660-667.
13. Silva, A.M.C.B., da Cunha, J.R.R. and da Silva, J.P.C., 2014, March. Estimation of pedestrian walking speeds on footways. In *Proceedings of the Institution of Civil Engineers-Municipal Engineer* (Vol. 167, No. 1, pp. 32-43). Thomas Telford Ltd.
14. Goh, B.H., Subramaniam, K., Wai, Y.T., Mohamed, A.A. and Ali, A., 2012. Pedestrian crossing speed: the case of Malaysia. *International Journal for Traffic and Transport Engineering*, 2(4), pp.323-332.
15. Goh, B.H., Subramaniam, K., Wai, Y.T., Mohamed, A.A. and Ali, A., 2012. Pedestrian crossing speed: the case of Malaysia. *International Journal for Traffic and Transport Engineering*, 2(4), pp.323-332.