

DETERMINATION OF WALKWAY USAGE INDEX IN MARKET AREA OF DHAKA CITY

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ABSTRACT

The study is focused on determining the walkway usage index in market area of Dhaka city. Two prominent market areas like New Market & Bashundhara City Shopping Mall were selected to perceive the overall condition of pedestrian walkway of Dhaka city. Historical research shows that a very few researches were conducted on pedestrian friendly walkway. The study reveals that walkway usage index in market places of Dhaka City is almost half of the total pedestrians in both peak and off peak hours which indicate approximately half of the total pedestrian is unable to use walkway of market area. The reasons behind this problem are unavailable walkway width, presence of hawker along the road, poor surface condition of walkway, insufficient road crossing facilities etc. There is a proportional relationship between the usable area and walkway usage index. The overall quality of walkway is found average in our observation. The aim of this research work was to identify overall condition of pedestrian walkway and their usage which would facilitate the authority to take proper steps to provide remedy to the problems of walkway in the market places of the City.

Keywords: Market place; pedestrian; walkway usage index

INTRODUCTION

Walking is a commonly used mode of transport for people in Dhaka City. The proportion of trips made by walking is substantial, and for some people walking is not only a matter of choice and convenience, but also a matter of economic necessity. It is also a way to get rid of traffic jam. According to some estimates, nearly 40% of the pedestrian walkways are being occupied illegally. As a consequence, pedestrians are often forced to walk in the street instead of on the footpaths that results pedestrian injuries and traffic congestion (The Strategic Transport Plan Final Report, December 2005). Walkway usage index is a new term introduced here. The term is 'Walkway Usage Index' which may be defined as the percentage of pedestrians among the total users who are willing to/capable of using an existing walkway on that travelling route. It also lightens up about the condition of the walkway in the selected areas and the reasons behind the reluctance of using walkway in the market area.

A previous DevCon (2009) report noted that there are only about 400 kilometres of walkways within the DCC area, compared to a road network of 1,293 km. The ideal condition is walkways should exist on both sides of a street; this suggests that Dhaka should have almost 2,600 km of walkway. However, only 37% of observed roads had walkways on both sides, and almost half had none at all [2]. Moreover, in Dhaka City most of the walkways do not meet the ideal quality. Due to that reason majority of the pedestrians in Dhaka City are compelled to walk on the road instead of walkway. About 40% of the total trips are made on foot in Dhaka but the pedestrians are facing many problems while using the walkways.

According to BRT (Bus Rapid Transit) report a major factor in pedestrian injury is the lack of good quality walkways, as people are forced to walk on the road. A recent analysis of total 5836 reported road accidents which occurred in metropolitan Dhaka during the period January 1998 to December 2004 has provided some characteristics of the pedestrian accidents. There were 2726 pedestrian accidents in metropolitan Dhaka in seven years which is 48% percent of total accidents (Dhaka Metropolitan Police Database, 2004). Current statistics revealed a deteriorating situation in Metropolitan Dhaka. Pedestrians are now making up approximately 72% of road fatalities, 45% of casualties and are involved in about 48% of all reported accidents. Over all Bhutan and Nepal had the highest share of pedestrian deaths

whereas industrialized countries like Denmark, France, Germany, USA has much lower deaths(Rahman et al., 2006).

Dhaka is situated in the economic heartland of Bangladesh. This city is one of the fastest growing startup hubs in the world. There are many market areas around Dhaka city. The major market areas of the city are New Market, Bashundhara City, Bango Bazar, Jamuna Future Park. Historical research shows that there are few analyses had taken place before about pedestrian friendly walkway. Therefore, the quality of pedestrian walkways in Dhaka City and the overall condition of its walkway have not improved enough to provide pedestrians a friendly and safe walkway. However, this research will try to portray the picture of existing walkway conditions around market area of Dhaka City from a set of traffic, geometric and choice rating data collected from the study site. This study will determine the percentage of users who refrain themselves from using walkways for walking and also find out the reasons that affecting the people to walk on the roadway instead of walkway. This research may help to gain some insights about the policies and options for pedestrian friendly walkway in Dhaka city.

STUDY METHODOLOGY AND DATA COLLECTION

Choice of Location (Market Place)

In this study, walkways of two different market areas of Dhaka city Bashundhara City and New Market were selected to perceive the pedestrian behaviour of market area because of land use diversity, different groups of consumers and highly attracted zones for different income people. New Market area is composed of some institutional land use and with some shopping centers. Well known Dhaka University campus is very close to this area and some other institutions are at a walking distance too. Bashundhara City is one of the largest markets of Bangladesh has constantly been named as one of the most visited attractions in Bangladesh. It is nearer to Karwan Bazar which is designated as a business district and commercial zone of Dhaka City.

In every location, a 500m long walkway was selected for the study. Then each walkway was divided into 5 segments. It means each segment was 100m long, total 10 segments of 1 km long walkway were considered to be surveyed.



Fig. 1: (a) The selected 500m walkway in front of New Market; (b) The selected 500m walkway in front of Bashundhara City Shopping Mall.

Data Collection

The whole data collection procedure was conducted from October to December of 2014. For survey and data collection, working days were chosen rather than holidays to get the actual walkway using rates by the pedestrian. Besides the day and time, the weather condition was also taken into consideration. Some typical issues were found on these walkways which are attached here to give a clear view about the walkway of those selected areas.



Walkway Occupied by Hawkers (New Market area)



Obstruction on Walkway (New Market area)



Poor Quality of Walkway (New Market area)



Presence of Hawkers (Bashundhara City area)



Portion of Over Bridge on Walkway and Construction Material on Walkway (near Bashundhara City market area)



Collection of Geometric and Pedestrian Data in Study Areas

The geometric data was collected with the help of pedometer (An Android App using on a cell phone) and endomondo (tracker type Android App). The length and profile of walkways, length of obstruction which was long enough to measure with a tape was measured with pedometer. The regular and effective width of walkway, width of buffers and shoulders, width of obstruction were measured with the measuring tape. Manual counting like tally sheet method had been adopted for pedestrian counting. Detail video recording of pedestrian flows in this study walkway was recorded.

Table 1: The collected geometric data of the walkway of New Market

Sl No.	Collected Data	0-100m	100-200m	200-300m	300-400m	400-500m
1	Average width of walkway(m)	2.03	2.03	2.46	1.32	2.03
2	Average height of walkway(m)	0.254	0.152	0.152	0.152	0.229
3	No of barrier	24	0	0	0	0
4	No of driveway	0	0	0	1	0
5	No of sidewalk	0	0	1	0	1
6	Pedestrian volume(male) for 15 minutes counting(off peak) on walkway	122	168	175	209	226
7	Pedestrian volume(female) for 15 minutes counting(off peak) on walkway	93	96	62	45	70
8	Pedestrian volume(male) for 15 minutes counting(off peak) out of walkway	177	223	218	193	193

9	Pedestrian volume(female) for 15 minutes counting(off peak) out of walkway	143	90	95	48	34
10	Pedestrian volume(male) for 15 minutes counting(peak) on walkway	137	183	197	173	297
11	Pedestrian volume(female) for 15 minutes counting(peak) on walkway	82	93	85	48	75
12	Pedestrian volume(male) for 15 minutes counting(peak) out of walkway	192	247	187	212	203
13	Pedestrian volume (female) for 15 minutes counting out of walkway	111	117	103	77	90

Table 2: The collected geometric data of the walkway of Bashundhara City

Sl No.	Collected Data	0-100m	100-200m	200-300m	300-400m	400-500m
1	Average width of walkway(m)	1.75	2.10	2.29	3.10	2.73
2	Average height of walkway(m)	0.235	0.235	0.305	0.305	0.419
3	No of barrier	0	0	0	0	0
4	No of driveway	6	2	0	4	1
5	No of sideway	0	0	0	0	0
6	Pedestrian volume(male) for 15 minutes counting(off peak) on walkway	395	373	361	105	96
7	Pedestrian volume(female) for 15 minutes counting(off peak) on walkway	35	32	39	12	17
8	Pedestrian volume(male) for 15 minutes counting(off peak) out of walkway	97	101	88	152	117
9	Pedestrian volume(female) for 15 minutes counting(off peak) out of walkway	26	21	36	33	22
10	Pedestrian volume(male) for 15 minutes counting(peak) on walkway	515	541	437	122	132
11	Pedestrian volume(female) for 15 minutes counting(peak) on walkway	45	53	78	13	17
12	Pedestrian volume(male) for 15 minutes counting(peak) out of walkway	122	152	117	252	185
13	Pedestrian volume(female) for 15 minutes counting(peak) out of walkway	17	37	34	41	31

DATA ANALYSIS AND RESULTS

Walkway Uses Index for Total participants

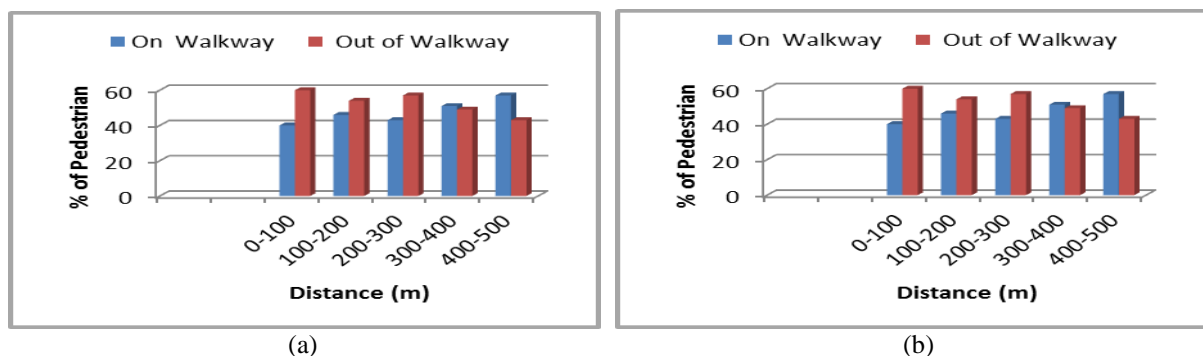


Fig. 2: (a) Comparative view on percentage of pedestrians moving on & out of walkway on peak hour in New Market area; (b) Comparative view on percentage of pedestrians moving on & out of walkway on off peak hour in New Market area

Data represents that in New Market Area both in peak and off peak hour the percentage of the pedestrian on the walkway is approximately more than 45% whereas the percentages of the pedestrian walking out of the walkway is approximately more than 50%. That indicates more than half of the total users could not use the walkway for the presence of hawker, crowd of pedestrian, various obstruction & other different reasons.

The observation found that the percentage of female pedestrians were comparatively more or same than male on the outside of walkway in most of the segments both in peak and off- peak hour which indicates female pedestrians face more problems than male in New Market areas which compelled them to share the road with vehicle.

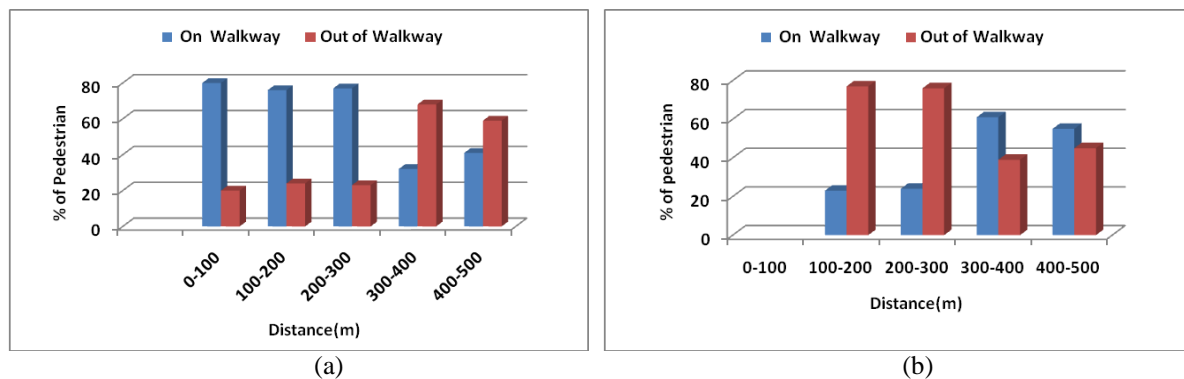


Fig. 3: (a) Comparative view on percentage of pedestrian moving on & out of walkway on peak hour in Bashundhara City area; (b) Comparative view on percentage of pedestrians moving on & out of walkway on off peak hour in Bashundhara City area

Here, data depicts that in Bashundhara City both in peak hour and off peak hour percentage of pedestrian walks above the walkway more than 60% & pedestrian walks outside the walkway is more than 35%. That means almost one third of total users could not use the walkway for different reasons.

In New Market area, pedestrian were compelled to walk outside the walkway more than Bashundhara City area. Both in these Market area of Dhaka City female pedestrian were compelled more than male to share the road with vehicle rather than walking on the walkway.

Walkway Uses Index with respect to Useable Walkway Area

Table 3: Comparison between the occupied area by obstruction and volume of pedestrian walking outside walkway

Study Location	Distance	Walkway Area(m ²)	Occupied Area(m ²)	Available Area(m ²)	% of occupied area	% of pedestrian outside walkway (off peak)	% of pedestrian outside walkway (peak)
New Market	0m-100m	203	121.03	81.97	59.6	60	58
	100m-200m	203	114.69	88.31	56.5	54	56
	200m-300m	246	81.8	164.2	33.3	52	54
	300m-400m	132	17.36	114.64	13.2	49	57
	400m-500m	203	20.87	182.13	10.3	43	44
Bashundhara City	0m-100m	175	12.65	162.35	7.2	22	20
	100m-200m	210	1.71	208.29	0.8	23	24
	200m-300m	229	0.63	228.37	0.3	24	23
	300m-400m	310	55.03	254.97	17.8	61	68
	400m-500m	273	52.50	220.50	19.2	55	59

From this table, it can be concluded that with the decreasing usable area the percentages of the pedestrians walking on the roads increases in both the market place areas.

Assessment of Pedestrian Perception who Use Road instead of Walkway

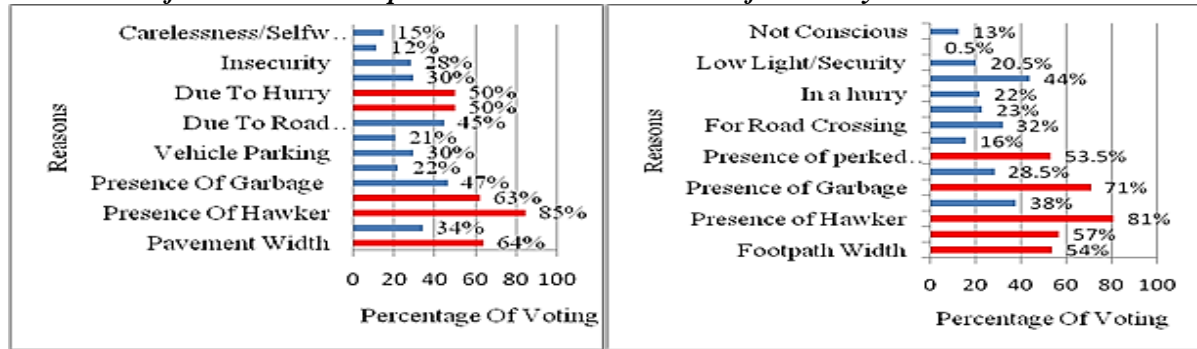


Fig. 4: (a) Graphical presentation of questionnaire survey (New Market: out of walkway); (b) Graphical presentation of questionnaire survey (Bashundhara City shopping mall: out of walkway)

The graphical presentation in Fig 4(a) shows in the New Market Area the presence of the hawkers on the walkway is the major reason that 85% pedestrian has chosen as their choice of the factors to walk on road. 64% pedestrians thought pavement width is the reason behind their walking on the walkway. In Bashundhara City area in Fig 4(b), 81% pedestrian has also chosen road to walk due to presence of the hawkers and 71% pedestrians avoid walkway to get rid of the presence of garbage. Therefore, it can be concluded that to dispel the hawkers on the walkway is one of the prior steps that should be taken in order to foster a huge number of pedestrians to walk on walkway.

Assessment of Pedestrian Perception on Quality of Walkway

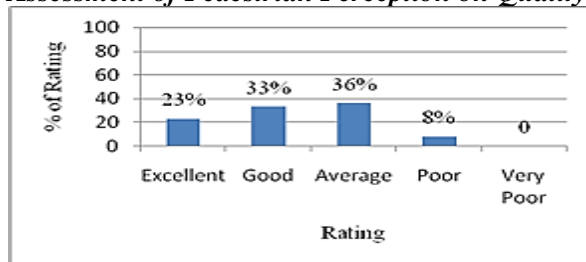


Fig. 5: Perception of Rating of New Market

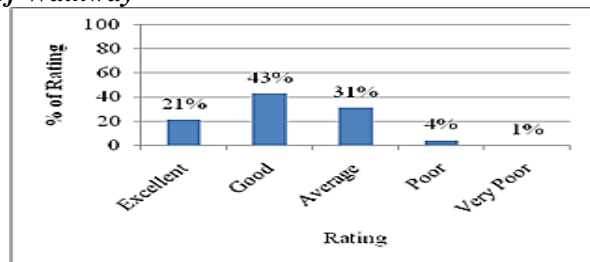


Fig. 6: Perception of Rating of Bashundhara City

In New Market Area analysis shows that 56% of the pedestrian’s observation was within excellent to good but 44% of the pedestrians rated the walkway to be average and poor. Thus it can be stated the walkway as an average service providing walkway which has rooms for improvement. In the Bashudhara City area, analysis shows that 64% pedestrians thinks the walkway to be good and excellent whereas 36% deemed the walkway to be average or below average in service quality.

CONCLUSION

This study shows a significant number of people cannot use walkway. So, it can be said that the condition of pedestrian walkway in Dhaka City is not satisfactory. The aim of this study was to find out the walkway usage index of pedestrian perception about the existing walkway of market area in Dhaka City. The study was limited for only one type of area of Dhaka City. The detail study about this index can be performed to improve it as a new quality measure of walkway. Therefore, the further study should be required.

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