Study of Walkibility Index of a residential area of a North eastern city of India.

Shib Sekhar Das[1], Somdeep Chakraborty[2]

[1] *Assistant professor, Tripura Institute of Technology, West Tripura, (India) PIN 799009*
[2] *Assistant professor, Tripura Institute of Technology, West Tripura, (India) PIN 799009*

ABSTRACT:-
From ancient times the Indian cities have always been the cities of walkers. Walking is a very significant mode of transport and irrespective of a person's social status we all Indian people are also pedestrians. Undoubtedly walking is the most indispensible, accessible and affordable form of transportation being used extensively everywhere in the globe. Even people who regularly drive vehicles need to walk for varying distances for which walkability is sometimes considered as an important measure to affect the quality of life. Walkability has been defined and assessed in many different ways which are suitable in different geographical and socio-economic condition of the area. This paper is an attempt to assess the wakability index of a residential area based on physical condition in an urban area.
Keywords:- walkibility , MOUD method, walkibility index

I. INTRODUCTION

Walking is considered as the most basic form of transport, because of it is considered to be the universal, it is very affordable, It acts as the bridge to connect various modes of transport, it reduces the risk of various diseases and prevent the pollutions caused by burning of fossil fuel. The four basic distinguishing features of "Walkable environment" that include "foot-friendly" man-made environment, the beneficial destinations are away at a walking distance, it helps in connecting people socially and culturally , it helps in psychological wellness of the community. It helps as a economical booster in commercial areas.

The primary point of our study is find the walkability index of Agartala city one of north-eastern fastest growing city of India. It is necessary to find the safety, comfort and convenience level of walking for pedestrians for which we need to calculate the walkability index of the city. "Ministry of Urban development (MOUD) Method" is being used to to determine walkability index of agartala . This method is most suitable in Indian conditions.

The city of Agartala is smaller in size the municipal corporation comprises of only 76.5 KM^2 (amc) hosting a population of 400004(2021 census) . Although the city is small but people like to have other means of travel rather than walking. The walkability index may helps to identify areas that need improvement and to make the city pedestrian friendly.

II. METHODOLOGY

Ministry of urban development (MOUD) method:-

This method was developed by Ministry of Urban Road Development (MOUD), Government of India. They especially developed this method based on the Indian conditions. According to this method walkability index is a function of availability of footpath and pedestrian facility rating. This can be calculated using equation given below.

Walkability Index$= [(W1 \times$ *Avalibility of footpath* $) + (W2 \times$ *Pedestrian facility ratings*$)]$. Pedestrian Facility Rating has been calculated on the Score estimated based on opinion on available pedestrian facility from the stake holders Where, W1 and W2 are weights (assumed 50% for both) Availability of footpath in study area = Footpath length in study area / Length of major roads in the city Pedestrian Facility Rating = Score estimated based on opinion on available pedestrian facility.

For calculating Walkability index we need of footpath and pedestrian facility ratings. Pedestrian facility survey for taking pedestrian ratings is prepared which includes the design and usability factors of pedestrian facilities that are provided in the study area. The length of the roads and pathways in the study area is calculated using the city plan or Google maps. For finding the pedestrian facility rating, a pedestrian survey is to

be done.The stakeholders have to rate the above mentioned attributes on a scale of 5 point where '1' defines 'very dissatisfied ' and '5' define 'highly satisfied' in the existing condition.

Study area: - The Ramnagar area is located in the western part of the city. The land use map of the area shows it is mostly residential with some mixed use units along the TG roads and a very few mixed use in the internal part of the road the

study area has two arterial road TG roads in eastern side connecting airport and Akhaura road on the southern side connecting the international border. Which act as feeder for all the internal roads. The total geographical area comprises of $6.7KM^2$ (as per the map) and comprises of a total road length of 25390 m of internal roads. Most of the collector road has pedestrian infrastructure on the sides of the road. But foot path is missing in the network of local roads.
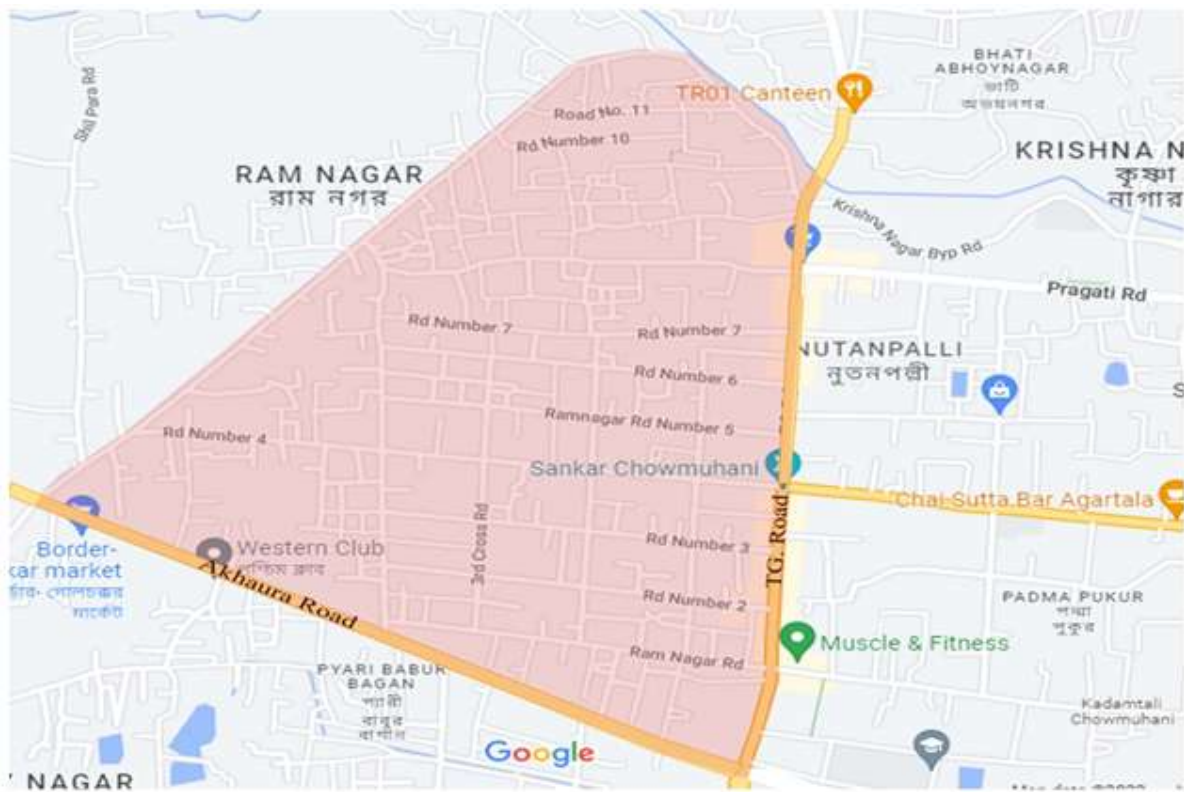

Figure-1: map of study area

III. DATA ANALYSIS:-

In accordance to the procedure used by MOUD, the length of roads in the study area was estimated fromthe map of city. It was found the total blacktop length in the study area was 25390m. The length of walkway was measured and It came out to be 5398 m. Pedestrians perceptions were collected on 10 decision attributes. i.e. Availability of walkway, Adequacy of Walkway width, Walkway height is reasonable, Smooth and

regularity of the surface, Continuity of walkway, Sufficiency of illumination during night, Obstruction in walk way, Presence of traffic separator like railing, Walkway is maintained and cleaned, Availability of walkway on appropriate side of carriageway .Altogether 200 sample were taken from different groups of stakeholder as mentioned in table 1 their scores were taken on a scale of 1 to 5. The average values of response is calculated and is being represented in Table 1.

Attribute	Score on the scale of 1 to 5 1=very dissatisfied , 2= dissatisfied,3= neither dissatisfied or satisfied , 4= satisfied, 5= very satisfied				Overall
	Gender	Occupation	Annual House hold income	Age group	

	Male	Female	Student	others	< 6 lacs	>6 lacs	Below 30	Above 30	
Availability of walkway	2.5	3	3.5	3	3	3.45	2.77	3.16	2.87
Adequacy of Walkway width	2.25	2.83	3.44	3.15	2.85	3.15	3.25	3.0	2.98
Walkway height is reasonable	2.15	2.25	3.15	2.88	2.98	2.78	3.0	2.95	2.76
Smooth and regularity of the surface	3.0	3.24	2.95	2.78	2.88	3.0	3.0	2.98	2.92
Continuity of walkway	3.75	3.83	3.18	3.74	3.15	3.25	3.78	3.55	3.62
Sufficiency of illumination during night	2.75	2.23	2.95	2.85	2.98	2.65	2.96	3.15	2.87
Obstruction in walkway	3.52	3.24	3.57	3.16	3.18	3.75	3.12	3.6	3.4
Presence of traffic separator like railing	1.66	1.85	2.0	1.77	2.25	1.87	2.21	1.98	1.98
Walkway is maintained and cleaned	1.5	1.6	2.2	2.33	1.66	2.0	2.0	1.56	1.86
Availability of shaded area in the footpath	3.45	3.77	3.87	3.96	3.70	3.66	3.15	4.0	3.51
Average	2.65	2.78	3.08	2.96	2.86	2.95	2.92	2.99	2.87

Table-1: Average pedestrian rating on different attributes based on survey

IV. RESULT:-
Walkability index for Agartala is calculated using the formula as below:

$Walkability\ Index = [(W1 \times Avalibility\ of\ footpath) + (W2 \times Pedestrian\ facility\ ratings)]$

Where, W1and W2 are weights (assumed 50% for both)

Availability of footpath : Footpath length / Length of major roads in the city

Pedestrian Facility Rating : Score estimated based on opinion on available pedestrian facility

$WI = [0.5 \times (5398/25390) + (0.5 \times (2.87 /5))] = 0.394$

Therefore the WI of Agartala is found to be 0.394

Similarly the WI of the different pedestrian group has been found and represented graphically below in graph no 1.
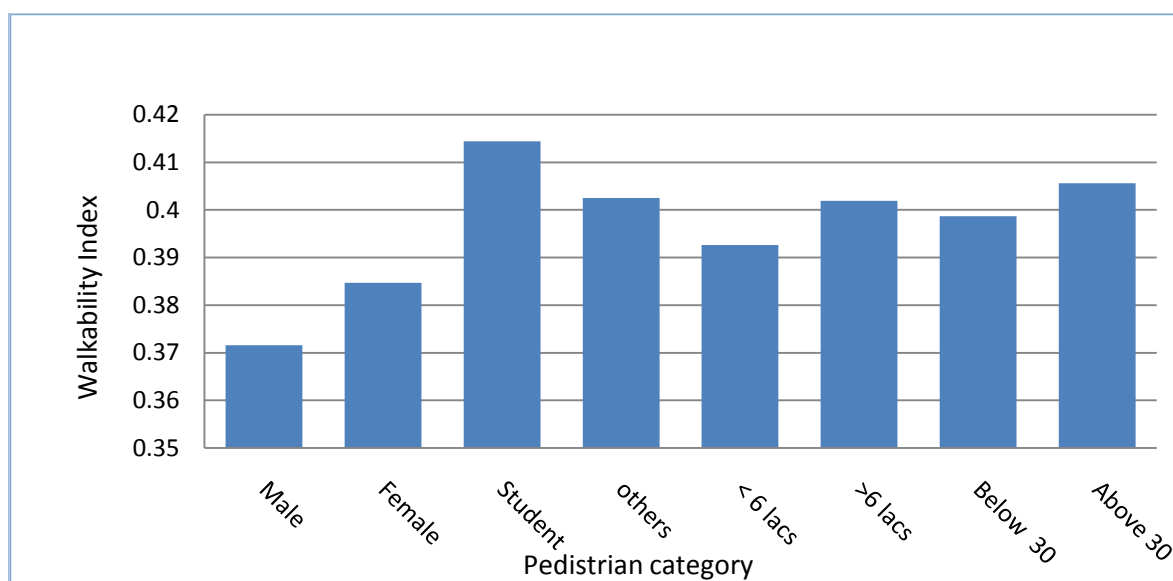
Graph1:- variation in walkibility index for different user group

V. CONCLUSION:-
Walkibility index of agartala is found to be 0.394 which is satisfactory to some extent, but needs a lot of improvement. The Walkability Index calculated indicates that only a few efforts are needed to improve the walk able conditions of the city. If the walk able conditions improve, it will help in reducing the various menaces including accidents, air and noise pollution congestion and diseases. The city which is more walkable is more vigilant to the social crime. most of the people will prefer walking if adequate street infrastructure is provided for the convenience of the pedestrian. This mode of transport will help in reducing the carbon footprint of a city and will have a great contribution in building a healthy society.

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