

# Qualitative Evaluation of Sidewalk based on user's perception- A case study of CBD area of Nashik city

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**Abstract:** Walking is usually not considered as a transportation mode. This is because it does not employ vehicles or because it is the fundamental means of movement. But walking is most efficient and the most effective mode of transportation for the short trips. People walk for many purpose i.e. work, shopping, school, college and recreation etc. Usually every journey necessarily starts and ends as a walk trip. All trips in the urban areas, be it by bus, car or train begin and ends as a pedestrian movement.

In India, the proportion of pedestrian movement is very large. Pedestrians are the most unsafe among road users and the most affected in urban traffic accident. Complete separation from vehicle through space may solve the problem of pedestrian's suffering in road traffic accidents. These can be achieved by using stairways, sidewalks or pedestrian bridges and subways i.e. foot over bridges and foot under bridges which is defined as pedestrian movement in vertical direction or at gradients.

**IndexTerms—** Pedestrian, walking, sidewalk.

## I. INTRODUCTION

Due to rapid urbanization in India, the traffic volume is tremendously increasing on the roads. The motor vehicle industry is demanding with an production rate of 5 million vehicles per year. This leads to clumsiness on roads giving an unsuitable condition for movement. For some time, transportation engineers and planners have focused on the development vehicular transportation system. Even today, the motorized transportation system receives an overwhelming priority over systems that serve the needs of non-motorized users such as pedestrians and bicyclists. However, in recent years, emphasis has been shifted towards improvement in pedestrian facilities and operations in order to withstand the challenges of congestion, air quality, improving safety and quality of life.

## II. PROBLEM DEFINITION

Rapid urbanization has taken its toll on pedestrian safety levels, often the traffic engineers in order to provide better transportation facilities either fail to provide pedestrian facilities on the roadside or compromise the safety of pedestrians. So the need of the hour is to provide a safe environment for pedestrians without any conflicts with other modes of transportation. This paper attempts to determine factors affecting sidewalk's performance based on pedestrians' perception.

Information collected from pedestrians is used to predict a set of qualitative variables to determine the extent to which sidewalk's current level of service meet pedestrian's expectation. In addition, improvements that can be achieved based on pedestrian's perception of the condition of the sidewalk were discussed. In this study, field observation is performed in the sidewalk where street vendors exist along the sidewalk. Therefore, the pedestrian opinions can incorporate street vendor's presence in correlation with sidewalk performance.

## III. OBJECTIVE OF THE STUDY

- To identify the various factors affecting pedestrian's perception on quality of service
- To define various categories of level of service boundaries by using an appropriate classification techniques
- To determine level of service for existing sidewalk

#### IV. METHODOLOGY

First step is Problem identification in which the problems faced by the pedestrians are found out while walking on the sidewalks and many other problems based on different factors such as safety, comfort, etc. The second step is the study of literature base in which research papers related to the same subject are studied which helps us in further study. The third step consists of setting objectives which depends on the problems which are earlier by the pedestrians are identified and the objectives are set accordingly which has to be full filled in the further study. The fourth step consists of identification of site in which College Road in Nasik city is selected as it is one of the most crowded place in Nasik city and which consists of a large number of pedestrians as College road has many shopping malls, colleges, restaurants, hospitals etc. The fifth step consists of data collection in which a survey is conducted on college road in which pedestrians on college road were asked questions based on four factors i.e. safety, comfort, encroachment and movement and accessibility and the responses were then further represented in the form of pie charts and bar charts. The sixth step consists of data analysis in which the analysis is done. The seventh step consist of conclusion in which the data analysis which is done will then help us to find the further conclusion.

#### V. STUDY AREA

The area selected for study is Nashik city as the Nashik city traffic consists of mixed traffic of slow and fast moving vehicles. Also cycles and pedestrian traffic is encountered in the arterial and sub carriageway and low vehicle speed, the carrying capacity of the roads is hampered by frequent congestion. There is substantial increase in the volume of motor vehicles, cycles and pedestrian traffic due to high rate of industrial development. There is also a marked increase cars in the city roads. Again, the problems are aggravated due to lack of footpaths and cycle tracks. Therefore a proper planning is required in the city keeping in consideration specially the pedestrians. Cycle tracks or footpaths should be provided alongside the roads so that the pedestrians feel safe and comfortable while walking.

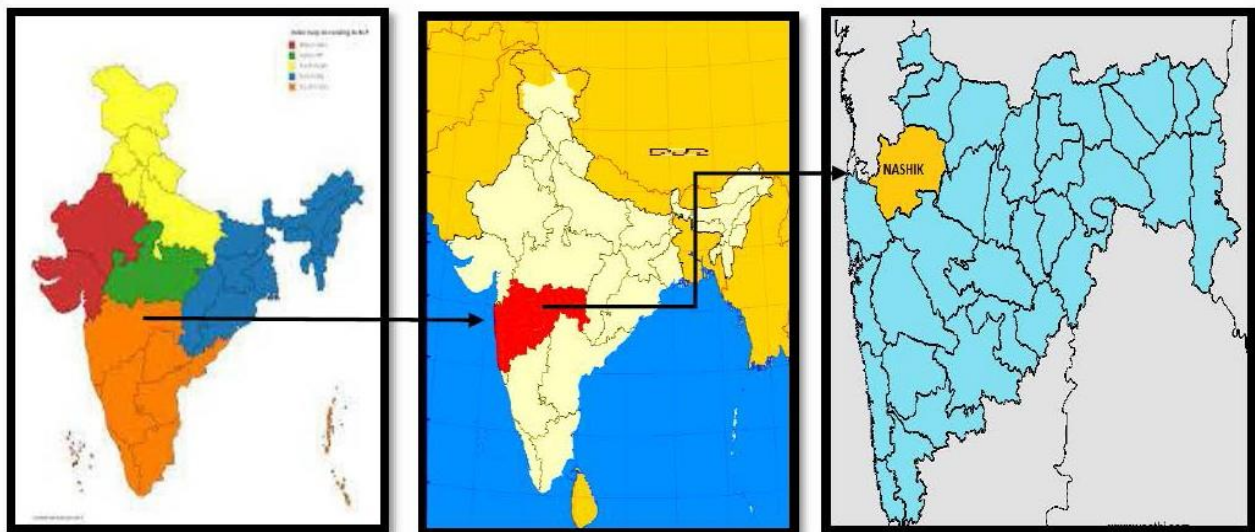


Fig : Location of Nashik District.

The site selected for study is College Road which is located in Nashik city. College Road is one of the most crowded place in Nasik as it consists of many shopping malls, cinemas, vegetable sellers, hospitals, colleges, shops etc. Therefore pedestrian population can be seen in a large number on this road. A survey was conducted on college road in which questions were asked to 200 pedestrians. The questions were asked on different factors. Taking into consideration the responses of the pedestrian's further study was carried out.

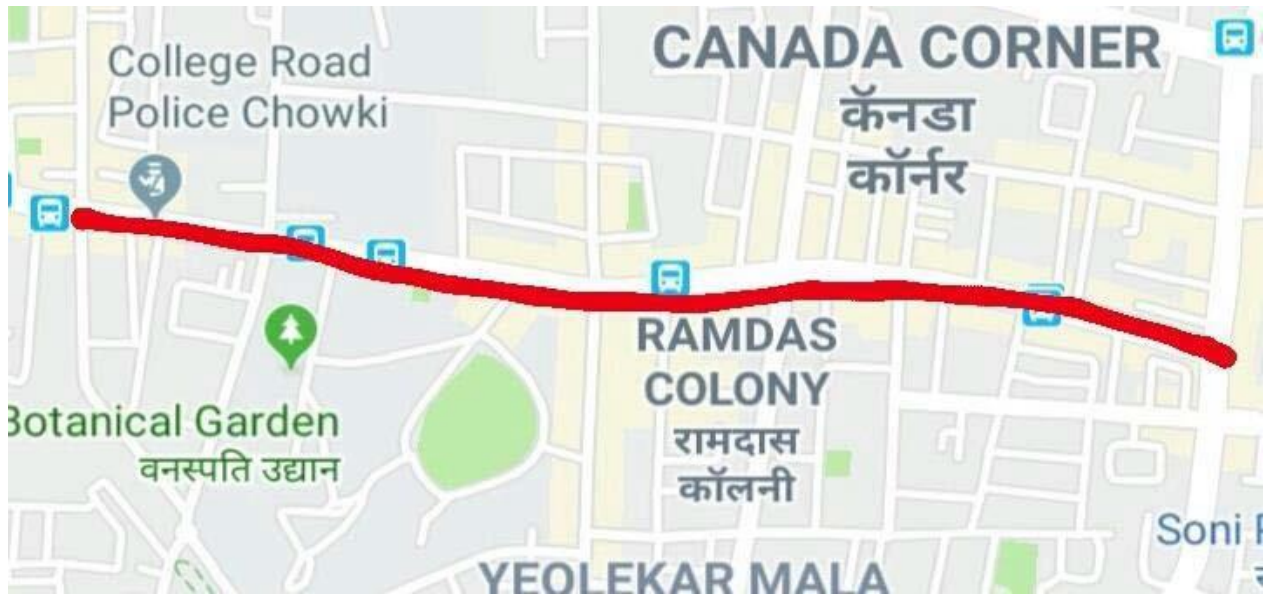


Fig : College Road

## VI QUESTIONNAIRE FORMATION

Gender:

Age:

1. Safety;
  - a. From moving vehicles
  - b. From slip and fall
  - c. During night
  - d. From pickpockets and physical
2. Encroachment
  - a. Interest in goods sold by vendors
  - b. Interest in window shopping while walking
  - c. Do you think footpath is crowded due to vendors
3. Comfort
  - a. Comfort during walking on sidewalk
  - b. Space to avoid obstruction without decelerating pace
  - c. Can move comfortably with vendors obstruction
4. Movement of easiness and accessibility to public transport
  - a. Can you choose your walking speed freely
  - b. Can you overtake pedestrians freely
  - c. Can you see nearby city bus stand clearly
  - d. Distance is adequate to city bus stand

A survey was conducted on College Road in which the above questions were asked to the pedestrians. The responses are further shown in the form of charts.

## VII DATA COLLECTION AND ANALYSIS

Gender wise classification:

The survey which was conducted on College road where 200 pedestrians were asked questions related to various factors and the responses were then showed in the form of pie charts and bar charts.

The pie chart shows that among the 200 pedestrians there were 91 male's i.e.45.5% and 109 females i.e. 54.5%. This shows that according to the pie chart there were more female than male pedestrians.

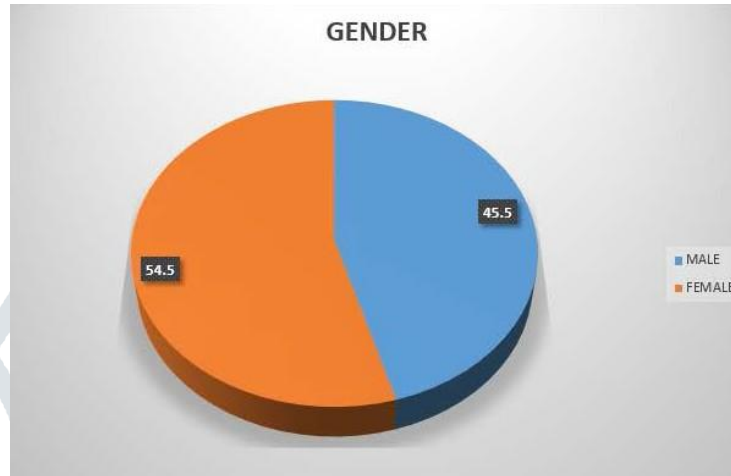


Fig: Pie Chart (Gender)

Age wise classification:

The above bar chart shows age wise classification which shows that according to the survey among 200 pedestrians there were 6.1% i.e. 12 pedestrians whose age was above 80yrs. There were 20.2% i.e. 40 pedestrians who were in the age group of 60 to 80yrs. There were 25.3% i.e. 50 pedestrians who were in the age group of 40 to 60yrs. There were 37.4% i.e. 74 pedestrians who were in the age group of 20 to 40yrs whereas there were 11.1% i.e. 22 pedestrians whose age was below 20yrs. This shows that the survey consisted of a greater number of pedestrians which were in the age group of 20 to 40yrs and there were a very less number of pedestrians which were above 80yrs.

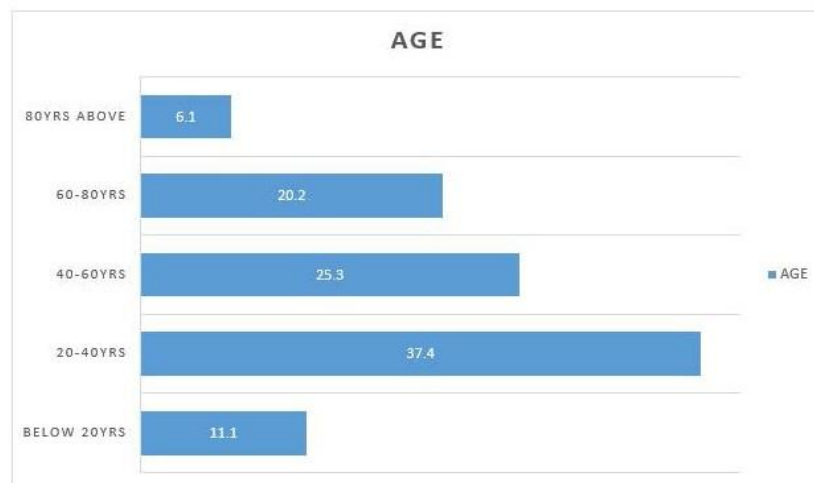


Fig: Bar Chart (Age)

Ratings for different parameters:

During the survey the pedestrians were asked questions on four factors i.e. safety, comfort, encroachment and movement and accessibility. Each factor is shown in the form of bar chart.

1. Safety

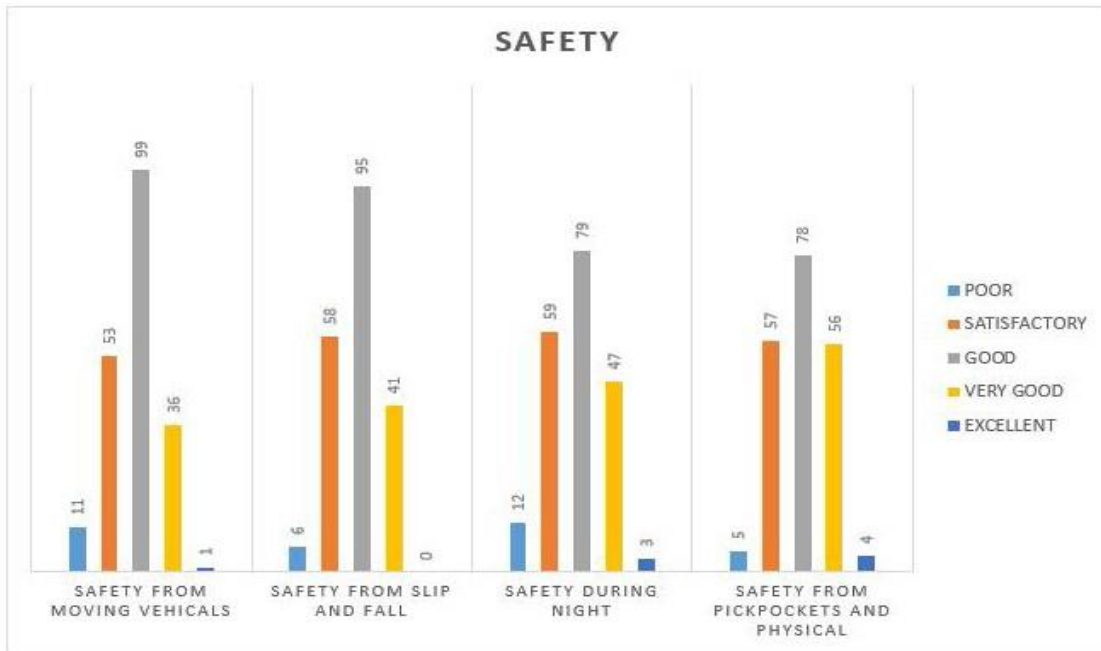


Fig: Bar chart (Safety)

2. Comfort



Fig: Bar chart (Comfort)

3. Encroachment

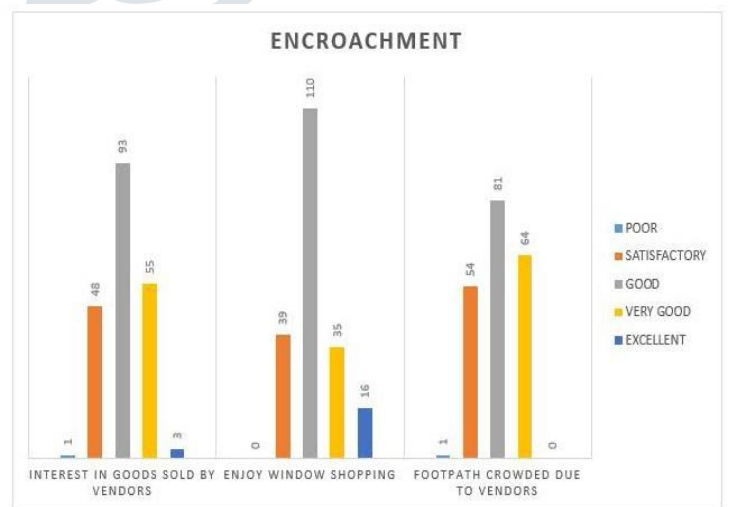


Fig: Bar chart (Encroachment)



## 4. Movement and Accessibility

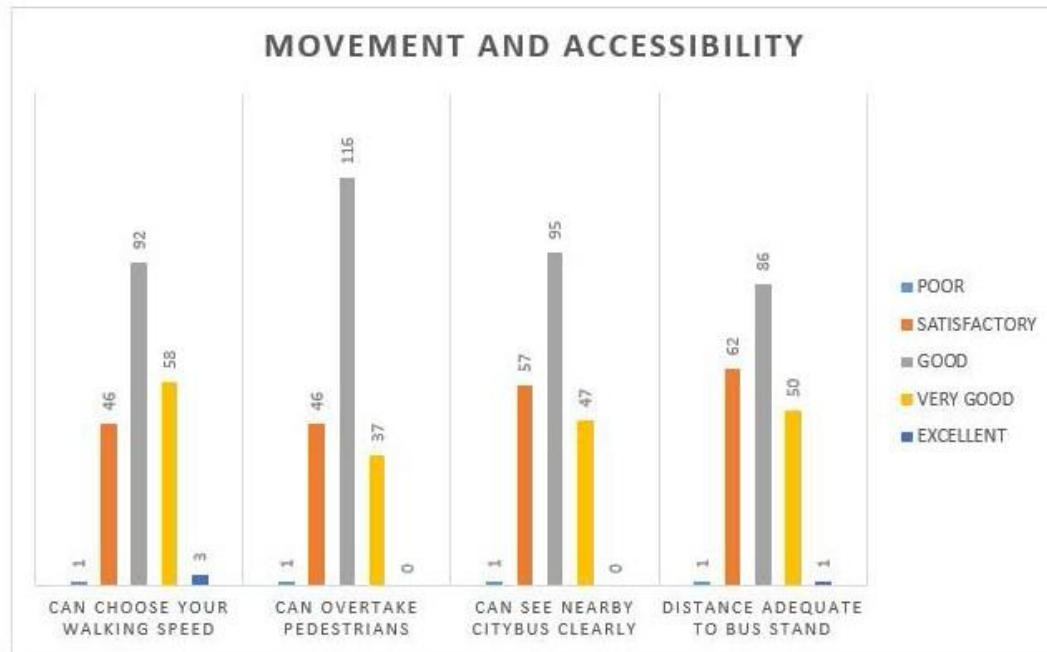


Fig: Bar chart (Movement and Accessibility)

Bar charts of each factor i.e safety, comfort, encroachment and movement and accessibility are shown above which help to show the overall responses of the pedestrians.

## VIII CONCLUSION

It has been tried to convey the importance of pedestrians and the problems faced by the pedestrians. It is the need of the hour to reduce vehicles on the roads and encourage non-motorized transport. Walking is the most basic form of commuting and is accompanied by a number of social, economic and environmental benefits. In order to encourage walking pedestrian facilities need to be provided on College Road keeping in mind the perception of pedestrians in terms of safety, comfort, encroachment and movement and accessibility.

## IX ACKNOWLEDGMENT

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