

Need for A Bicycle Corridor - A Case Study of Khazuri Khas - Gandhi Nagar Route, New Delhi, India

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Abstract: *The safety of the bicycle riders is being compromised with the day-to-day increase in motorized traffic and pays little attention towards providing a safe and pollution free environment to the bicycle riders. This paper aims to propose a cycle corridor from Khajuri Khas to Gandhi Nagar, New Delhi. Huge number of bicycle riders travel on this route daily. The area is a heavy traffic zone where traffic jams are a routine thing and hence bicycle riders are forced to travel on wrong side of the road or on footpaths which is dangerous for them as well as for pedestrians. The proposed cycle corridor of 4.5 km long is expected to cause congestion reduction in the studied route and assist safer and convenient travelling. The corridor will promote cycling and also aims at curbing pollution in the area.*

Keywords: Safety management, Non Motorized Transport, Cycle corridor, Cycle network planning, Total Station Survey

1. Introduction

Sufficiently large percentage of urban residents in India depends upon non-motorized transport (NMT) which includes walking, cycling and cycle rickshaws to meet their access needs. Being the most affordable form of transport available to low-income households, there exist large amount of utility cycling in Indian cities. However, rising income levels and the reduced level of service of existing facilities results in a greater dependency on privately owned motorized transport. The safety of the bicycle riders is being compromised with the day-to-day increase in motorized traffic and pays little attention towards providing a safe and pollution free environment to the bicycle riders.

In Delhi 60% of Trips are below 4 km. Cycles, Cycle-rickshaws & Walking are the ideal modes for short 1-4 km Trips. Walking & Cycle-rickshaws are the most important Feeder to Metro/ BRT Stations. Yet no Metro Station provides authorized cycle rickshaw parking [1]. According to RITES Transport Demand Forecast Study for DoT [2], 35% commuters in Delhi travel by walk and only 23% of the city's people use private vehicles (car/two wheeler). Studies found that 35% of people in Delhi own bicycle but only 4% trips are made by bicycle. Increased bicycle ownership, but with a decreased ridership indicates the poor infrastructure and congestion of routes that forces bicyclist to depend on other modes of transport. Lack of poor infrastructure also results in many fatalities or injuries to pedestrians and cyclists. There are more than 2100 accidents occurred each year and the maximum casualty in the fatal accidents are pedestrians, cyclists & two wheelers and the maximum accidents have occurred during the lean hours both in the morning & night. Absence of continuous cycle track, their poor design, and lack of road sense among the people are the common issues facing by the cyclists.

Literatures that emphasize the need for bicycle promotion and safety are many. [3] mentioned that the layout of all-purpose roads combined with the size, speed and complexity

of manoeuvre of motorized traffic can have a huge impact on the convenience and safety of cycle users. Hence cyclists should be able to travel with minimum effort, inconvenience and danger. [4] also showed that The National Urban Transport Policy (NUTP) and National Mission on Sustainable Habitat (NMSH) have stressed the need for an approach that focuses on people and not vehicles. Indian cities have a high latent demand for cycle and walking trips, which can be realized with the introduction of suitable infrastructure, facilities and resources. Road design must not increase dependence on and usage of personal vehicles. This is possible only if cities are built to prioritize public transport, walking and cycling and clean. In the report of High Powered Committee, MoUD [5], it is mentioned that good bicycle infrastructure needs to be provided for and a convenient bicycle sharing system should be developed which will help take the shorter trips off the arterial roads (thereby reducing congestion). Through an eye-tracking experiment on the bicycle network of Bologna, [6] found that the discontinuities of the path such as intersection and cross walks and the presence of pedestrians seems to be the elements requiring more attention for a safer bicycle ride.

To reduce the extra pressure on the transport network by the forecasted population Wellington City Council Cycleways Plan [7] outlines how to prioritize the development of the cycle network and how it will connect key locations throughout the city, and how it will increase the number of people who choose to get around by bike. The report covers solutions for multiple modes of transport, with an emphasis on improving transport choice and ease of access for all road users.

Centre for Research in Sustainable Urban Development and Transport Systems (CRSUD&TS) prepared a report [8] promoting cycling stating that cycling is amongst the most sustainable modes of mobility, which has zero dependence on fossil fuels and zero emissions unlike the motorized modes of transport, which have huge negative externalities, namely, accidents, congestion, fossil energy use, and environmental degradation. The Big Green Commuter Challenge (BGCC) by Portsmouth City Council lead to 46%

reduction in Co₂ and 17% reduction in NO_x as a result of modal shift from car to more sustainable modes of travel [9]. [10] used the case study of a cycling promotion scheme from University of Sheffield to examine commuting behavior and long term behavioral shift towards cycling and found that 75% of participants have increased the rate of cycling in two years.

[11] identified that the physical factors, safety related concerns and route topography are the key parameters those influence people's mode choice, from a case study of Kharagpur City, India. [1] showed current bicycle trends in different cities of India with bicycle modal share, trip length frequency, fatalities and injuries etc. The report also mentioned the ever-growing congestion and traffic bottlenecks leads to violation of traffic rules subsequently increase in road rage incidents. Accident Research Cell/Traffic [12] provides area wise analysis of road accidents in Delhi and also showing the causes of the accidents. The report mentions that. Another trend of serious traffic concern is the ever-growing congestion, and traffic bottlenecks, which has increased travel time implying that it takes more time for the people to reach to their destinations than usual. This leads to violation of traffic rules subsequently increase in road rage incidents. An article in Times of India [13] pointed that about 16 people die and 58 are injured every hour in India due to road accidents - the death rate, in fact, is equivalent to wiping out about 40 per cent of the population of a small nation like Maldives in a year. And Delhi has the highest number of fatal accidents among all cities, with five deaths per day. Hindustan times [14] reported by the end of 2018, Delhi may get its first elevated, covered cycle track. The Delhi government has submitted the proposed design of a 6-km long, 20-foot wide cycle track that will start from Satpula drain (Press Enclave Road, Saket) to Barapullah (Jawaharlal Nehru Stadium). Centre for Science and Environment [15] reported that Delhi records an average of five road accident deaths per day – four of these are of pedestrians and two-wheeler riders and every week, two cyclists and one car rider dies in Delhi. Also cities are designing roads to increase speed of motor vehicles; neglect infrastructure and rights of walkers, cyclists and public transport users. If road safety is compromised, cities cannot increase the share of sustainable modes such as walk, cycle and public transport for clean air and public health.

2. Need for the Study

There is an urgent need for developing a cycle corridor in the area of Khajuri Khas to Gandhi Nagar because a huge amount of low income people lives in this area and travel to nearby markets to earn money, their sole mode of transport is either walking or cycling. It's like a huge wave of Bicycle riders in the morning hours going to Gandhi Nagar and nearby places. But their safety is a major concern as due to intense traffic which is an everyday scenario takes their precious time and hence the bicycle riders are forced to go on wrong side, travel on footpaths, which is dangerous to their safety. Figure 1 shows the real problem of the bicycle riders travelling from Khajuri Khas to nearby area.



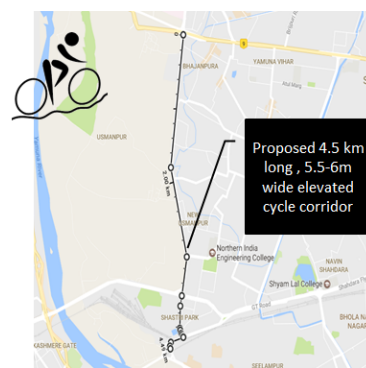
Figure 1: Bicycle riders travelling on wrong side of the road

On the Pushta roads from Khajuri Khas to Gandhi Nagar route the traffic conditions are always at its peak. At morning peak time, traffic flowing from Khajuri Khas travel from both the sides of the road and that too when there is a service lane as it to get clogged by the variety of vehicle classes. Cycle riders travel on wrong side of the road without any safety concerns and are unwilling to change this routine, a correct method according to them, practicing by years. When analyzed where these whole bunch of people go, many of those travel by bicycle are headed to the Asia's biggest wholesale cloth market and the other nearby places. These cyclists comprise to about 20% of the total number of vehicles in the peak hours' time. These high numbers of cyclists travel with high speed traffic makes their life as a great risk. These routes have no infrastructural plan for these cyclists and every day there is a minor accident.

Objective of this study is to emphasize the need for a separate corridor for bicycles in the Khazuri Khas- Gandhi Nagar corridor to

- give the safest and reliant route to the existing cycle users
- List Item - 2
- encourage the motorized vehicle owners to use cycle as their first choice of mode transportation
- decongest the existing road fully logged in peak time

This work gives a much needed safer, cost efficient and convenient access route than the existing route which is accident prone.



Starting point:

Khajuri Khas flyover

Ends at:

Gandhi Nagar

Areas that it will go through:

Khajuri Khas, Bhajanpura,

New Usmanpur, 5th to zero Pusta, NIEC college etc.

Size and facilities:

4.5 km long corridor, 5.5-6 m wide.

Figure 2: Proposed route for the bicycle corridor

3. Cycle Network Planning

A 4.5km long bicycle corridor starting from Khajuri Khas flyover and passing through Bhajanpura, New Usmanpur,

5th to zero Pusta and ending at Gandhi Nagar is proposed. Figure 2 shows the general information and route of the proposal.

4. Traffic Data Collection

Traffic data collection was done at major intersection points on the zero Pusta road and area nearby it, peak hour data was taken manually by counting method. Traffic data of all types of vehicles was taken at following places Khajuri Khas, Kashmiri gate Shastri park road intersection, Gandhi Nagar, Seelampur metro station, and at old iron bridge.

4.1 Traffic Volume in Peak hours

Peak hour traffic volume shows that there are 20% bicycle riders of the total traffic volume (Figure 3), which shows the necessity of developing a standalone cycle corridor. IRC 11-1962 [16] also states that for vehicle flow of more than 200 cycles per hour a separate track can be provided. Traffic data was also collected near Seelampur metro station but there was very low amount of cyclist hence a separate track was needed there.

Figure 4 shows the daily ridership frequency of bicycles from 7:00 AM to 8:00 PM. According to this the bicycle volume count decreases significantly during 1:00 PM to 4:00 PM and is at peak during morning and night hours. Paragraph comes content here. Paragraph comes content here. Paragraph comes content here.

Table 1: Peak hour traffic volume from Khajuri Khas to Gandhi Nagar

Time	Bicycles	Bikes	4-wheelers
8:00-9:00 AM	1480	3305	2548
9:00-10:00 AM	1649	3625	2670
10:00-11:00 AM	1628	3628	2698

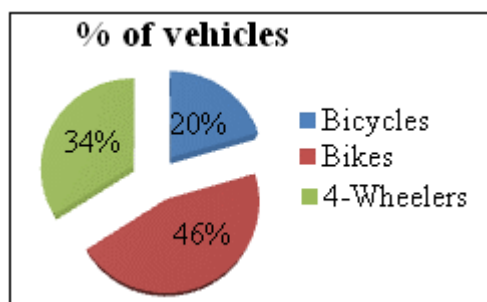


Figure 3: Bicycle modal share during peak hours on zero Pusta road

4.2 Trip Distribution

Figure 5 shows that bicycle trips originating from Khajuri Khas are distributed as, most of the bicycle riders travel from Khajuri Khas to Gandhi Nagar and a small share goes to Kashmere Gate and Chandni Chowk.

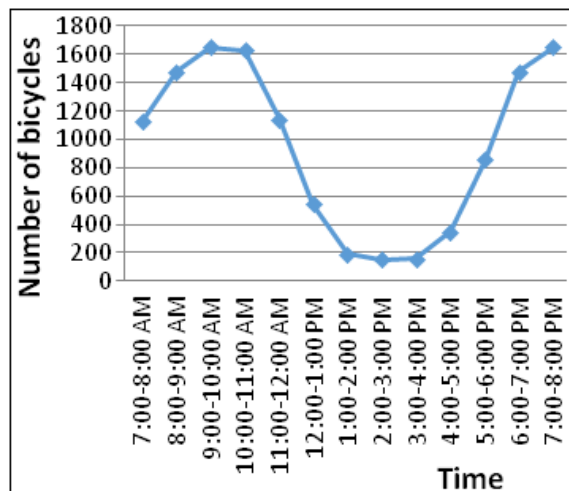


Figure 4: Daily Ridership Frequency on route from Khajuri Khas to Gandhi Nagar

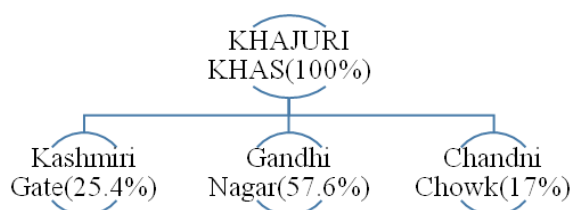


Figure 5: Distribution of bicycle trips from Khajuri Khas to Gandhi Nagar

5. Route Mapping

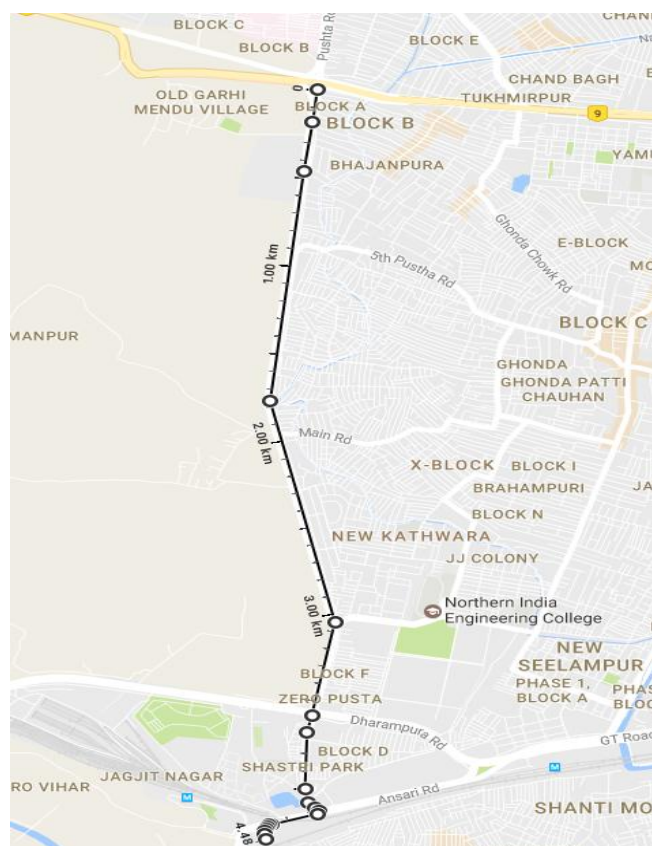


Figure 6: Route map of cycle corridor

Considering all of the above data, route between Khajuri Khas to Gandhi Nagar was selected which originates from

Khajuri Khas flyover and passes through 5th pushta, 31/2 pushta, Zero pushta, Shastra park and ends at Gandhi Nagar entry point.

Proposed length of the corridor comes out to be 4.5 km approximately (Figure 6). To get the geometric details of the areas where the bicycle corridor is proposed, Total station survey was done starting from Khajuri Khas. A temporary benchmark was set up and the points along the length of the road on the footpath were taken at 20-30 m intervals. At bends, points were taken more precisely at a relatively close distance. Points were taken along the road side and separate points of nearby structures were also taken. Also points running parallel to the road in the bank were taken directly by pointing total station towards the ground (Figure 7).

6. Conclusions

Cycling in the area from Khajuri Khas to Gandhi Nagar will be more convenient, better connected and safer because according to current scenario cyclist due to heavy congestion violate traffic rules and travel wrong side, on the footpath. Cycle corridor provides a much-needed separate route for the cycle riders in this area. As there are more than 90% are captive cyclists who travel short distances of less than 5 km this would give the boost to cycling in the city and easy access to the workers, worked in these heritage markets of Delhi

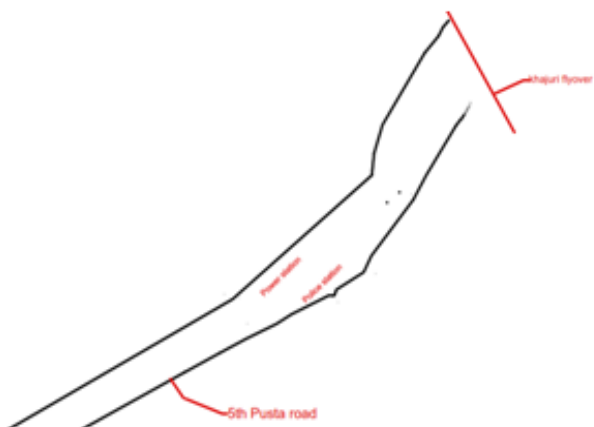


Figure 7: Total station survey for the selected corridor

As the cycling is good for health, if at the same time adopted as a first choice of transport medium, can lower the high consumption of fuel as well as the pollution due to vehicles. Cycling will improve the environment result in good health and better productivity results in overall development.

The proposed route from Khajuri Khas to Gandhi Nagar is a congested route and accident prone zone due to the high number of non-motorized vehicles travel with high speed motorized vehicles resulting in day to day conflicts and leads to heavy traffic. Proposed corridor separates them from motorized vehicles resulting in safe and speedy journey to both.

This study gives a necessary boost to the cycling infrastructure to the city which was one's known as a cycling city but today become a graveyard for them.

However, there exist extensions to the present study can be suggested as follows.

- Cycle corridor can be expanded to nearby places like Kashmere gate, Chandni Chowk which will give a great transport alternative for reaching these crowded areas.
- Provision for allowing motorbike on the cycle corridor during non-peak hours, can be looked upon, but for this, planning must done before constructing the corridor as cycle corridor will have to be designed accordingly.
- Provision for allowing other non-motorized vehicle on the corridor during non-peak hours, as the traffic flow is very small during this time, can be looked upon.
- Study to provide cycle sharing schemes at major stations across the corridor could be done to promote cycling.
- Connecting the cycle corridor to nearby metro stations.
- Monetization of the corridor with programme's like Rahgiri.
- Development of shop outlets on the cycle corridor in future.
- Commercialization of electricity generated from solar panel roofing along the corridor.

7. Acknowledgement

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