International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 06 | June 2021 www.irjet.net p-ISSN: 2395-0072

Temporal change study of Khurram Nagar intersection by Digitization of Road Network

Arpit Verma[1], Alok Saini[2], Dr Sudhakar Shukla[3]

[1]M.Tech Scholar, School of Geoinformatics, RSAC-UP, Lucknow, Uttar Pradesh, India
[2]Scientist, RSAC-UP, Lucknow, Uttar Pradesh, India
[3]Head, School of Geoinformatics, RSAC-UP, Lucknow, Uttar Pradesh, India

---

Abstract - Urban travel demand has been continuously growing in both developed and developing countries. Overall population growth and increasing urbanization have led to rapid growth of large cities, which are crippled by the sudden rise in travel demand. The supply of transport infrastructure and services, by comparison, has lagged far behind demand. Land prices and rental rates also escalate in city centers, which force establishments and housing to move to the city peripherals and thus further increasing everyday commuting. Certain developed countries have been quite successful in keeping traffic demands in checks. Urban travel demand has to be understood from the context of differentiated urban growth. To some extent, capacity increase is possible by slight modifications with little or no investments such as signal changes, widening of roads and extricating encroachments and designing the intersections.

Key Words: **Capacity, Traffic Infrastructure, Encroachments, Urban Travel, Intersections**

INTRODUCTION

There are various policies and initiatives underway to improve urban mobility in Indian cities, primarily aiming to enhance and strengthen urban infrastructure. In addition, cities have also adopted different traffic solutions and policies to enhance the traffic mobility. However, some of the conventional causes of congestion are still rooted in growing cities owing to policy overlaps and distorted policy implementation. These include insufficient and inefficient public transportation, mixed use of dedicated roads, less parking spaces, lack of connectivity between modes, poor driving behaviour, lack of transport planning, and the absence of intelligent transport systems, among others. In addition, the presence of informal operators in public transport system also has a critical impact on congestion. Therefore, it is certain that the creation of new infrastructure alone will not solve the problems, and that other aspects also deserve consideration. In the middle of city rotary plays an important role for smoothening the traffic so as the population in changing we can observe the role of rotary inside the city.

OBJECTIVE OF THE STUDY- Purpose of this study is to show how the growth of the city impact on the rotary shape and its design elements. Basic objective of the study

1- Digitization of rotary and road network.
2- Year wise change detection in shape and design of intersection.

LITERATURE REVIEW

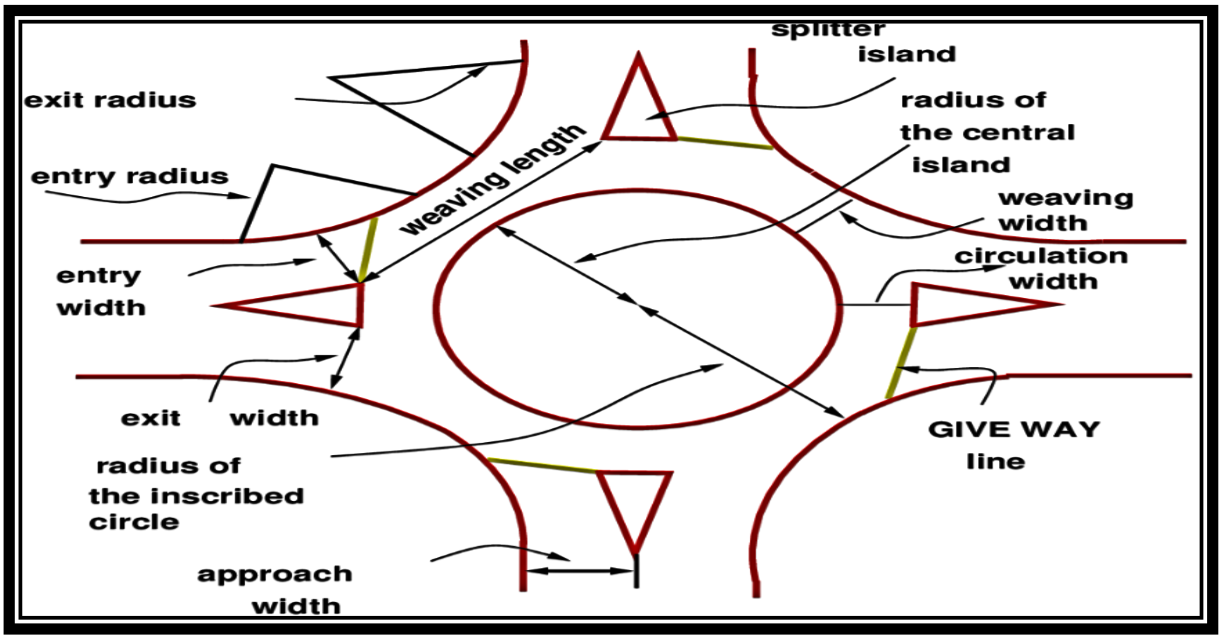
Suggestion of IRC-65 tells us that on which basis the shape and design of rotary is taken into account. Shape of rotaries can be different according to the traffic condition and location of area. As the load on the roads increases the volume and capacity of road becomes different from past year data of traffic. With continuous study of traffic data and growth in traffic we can select suitable design and action needed at any location.

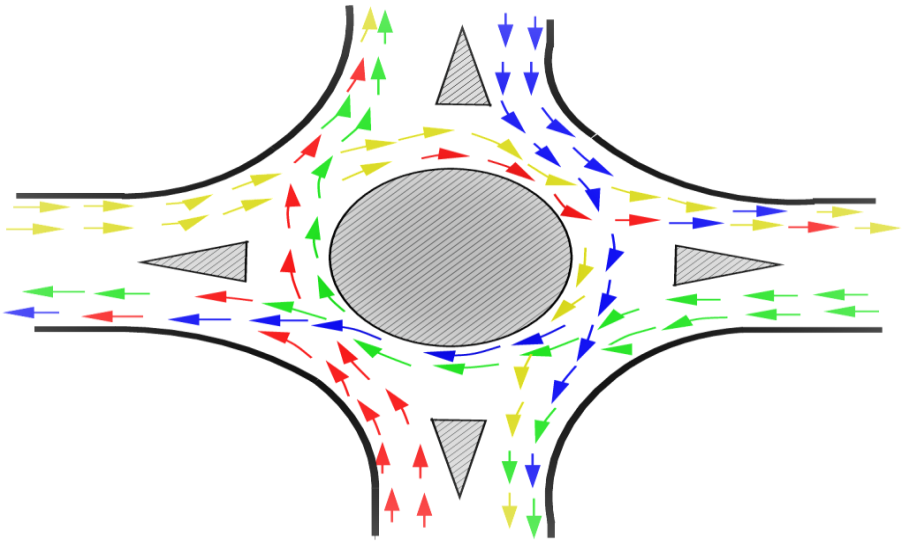
Rotary intersections or round abouts are special form of at-grade intersections laid out for the movement of traffic in one direction around a central traffic island. Essentially all the major conflicts at an intersection namely the collision between through and right-turn movements are converted into milder conflicts namely merging and diverging. The vehicles entering the rotary are gently forced to move in a clockwise direction in orderly fashion. They then weave out of the rotary to the desired direction. The benefits, design principles, capacity of rotary etc. will be discussed in this chapter.
IRC also suggested the shape and design of rotary according to the type of connecting roads to the rotary and flow of the traffic. As the number of registration of vehicle increases the load on the road changes drastically according to the travel timing and width of road.

Methodology

In this work the satellite image of the intersection is shown in accordance with year. Satellite image is digitized for showing the temporal change of shape of the intersection and connecting roads. The satellite image is from the year 2003 to 2021 showing the change in pattern of the area and the elements of intersection.

Type	Shape
Circular Rotary	All roads have equal importance
Square Rotary	Good for straight moving vehicles
Elliptical, Ovel Rotary	It gives long weaving length
Irregular Rotary	For more number of approaches





Directions:

1-Tedi Pulia

2- Rahim Nagar

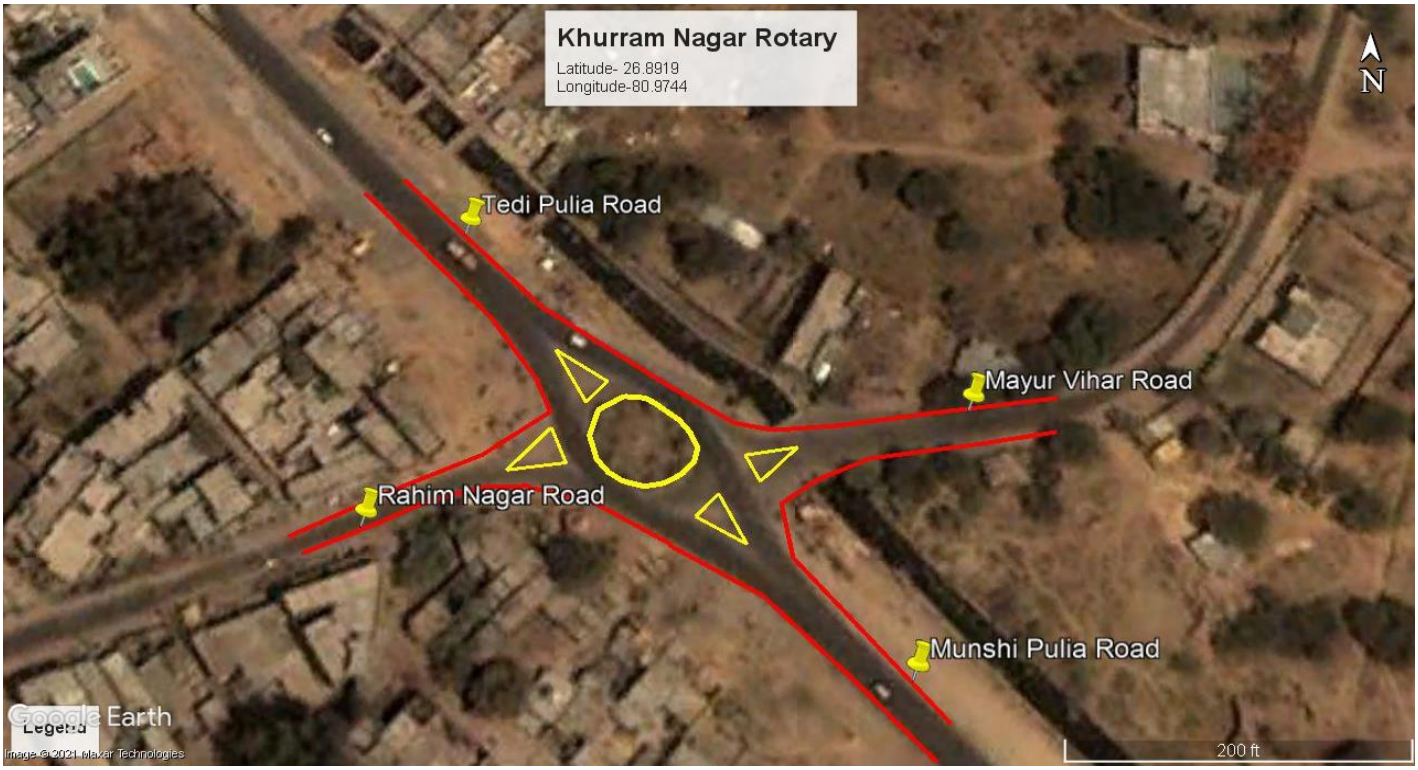
3-Munshi Pulia

4-Mayur Vihar

Study Data- Location of the rotary is on the ring road of Lucknow-Sitapur road. The study data shown is from the year 2003-2021.Satellite image is shown in the pattern how the change is going on.

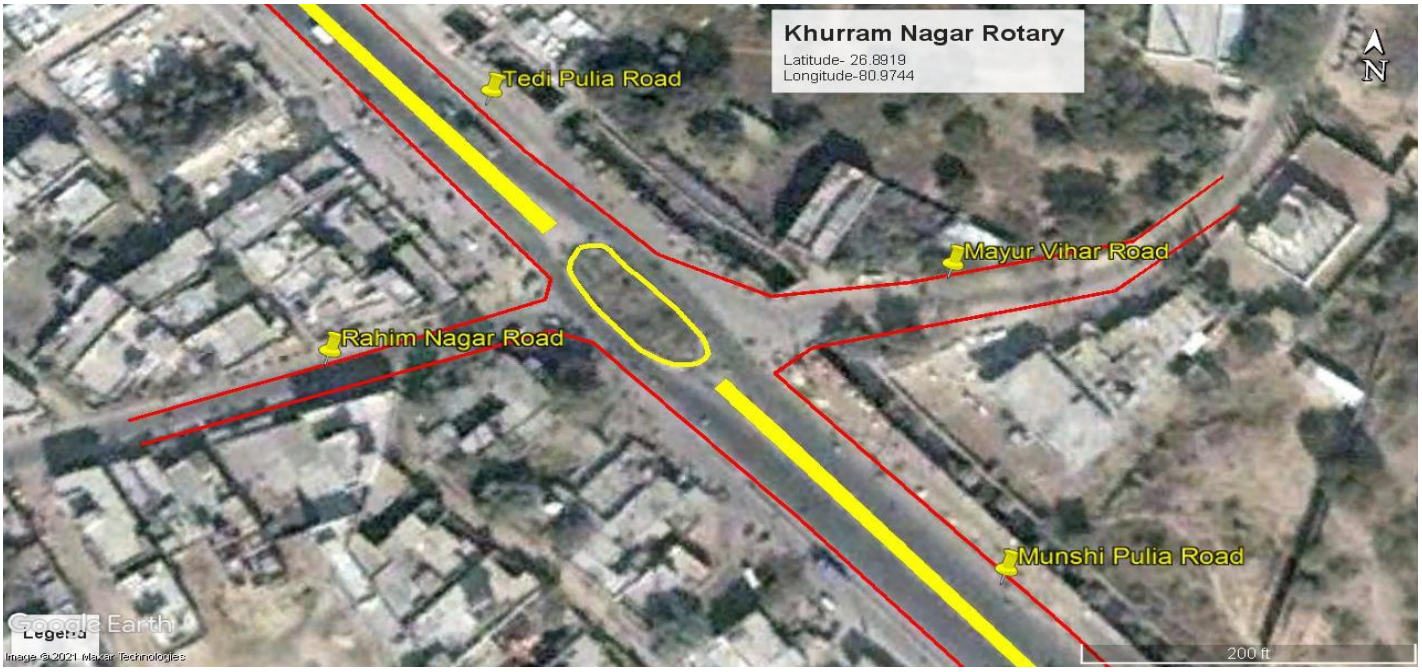
Year- 2003

Shape- Circular



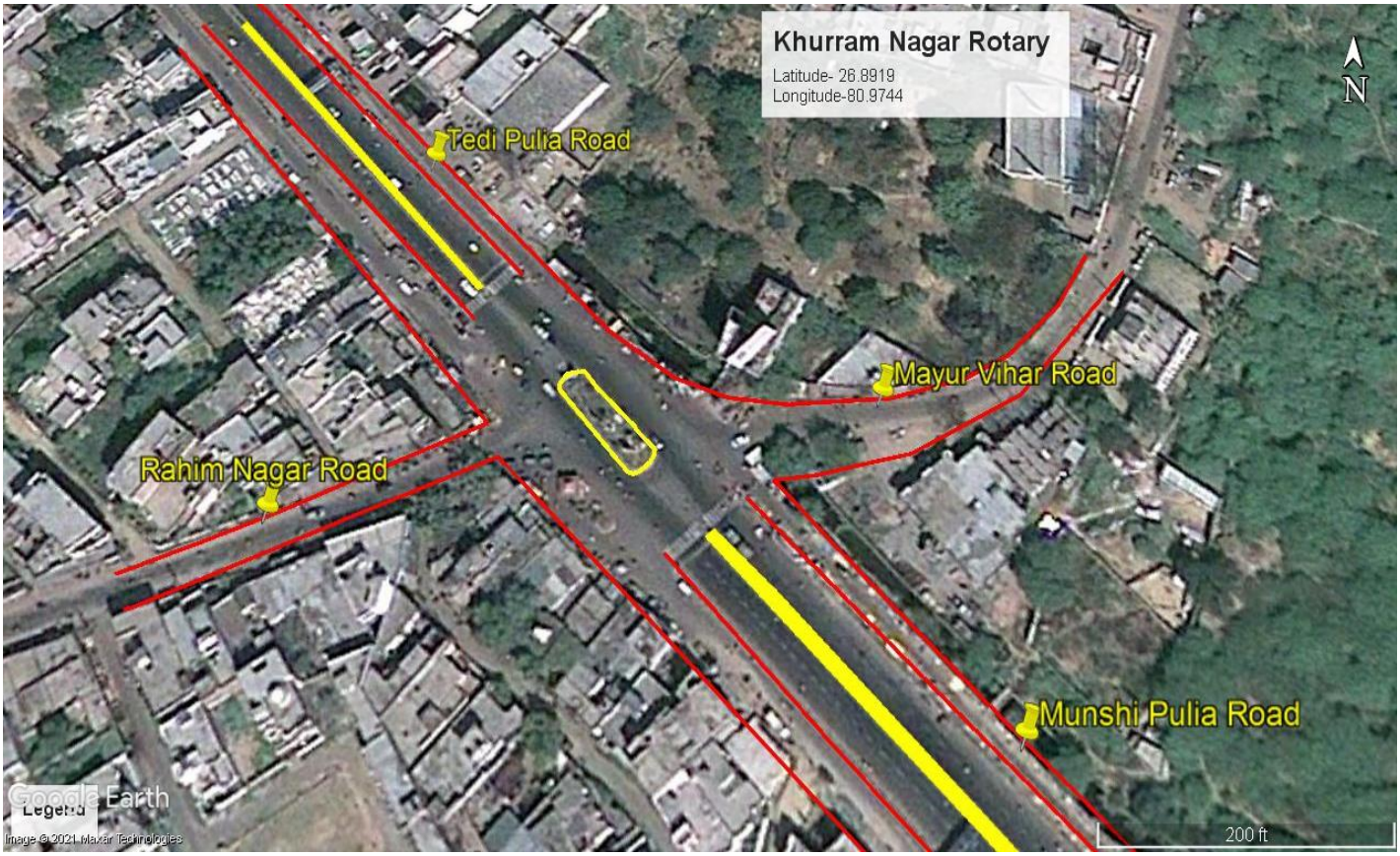
Year- 2006

Shape- Elongated/Ovel



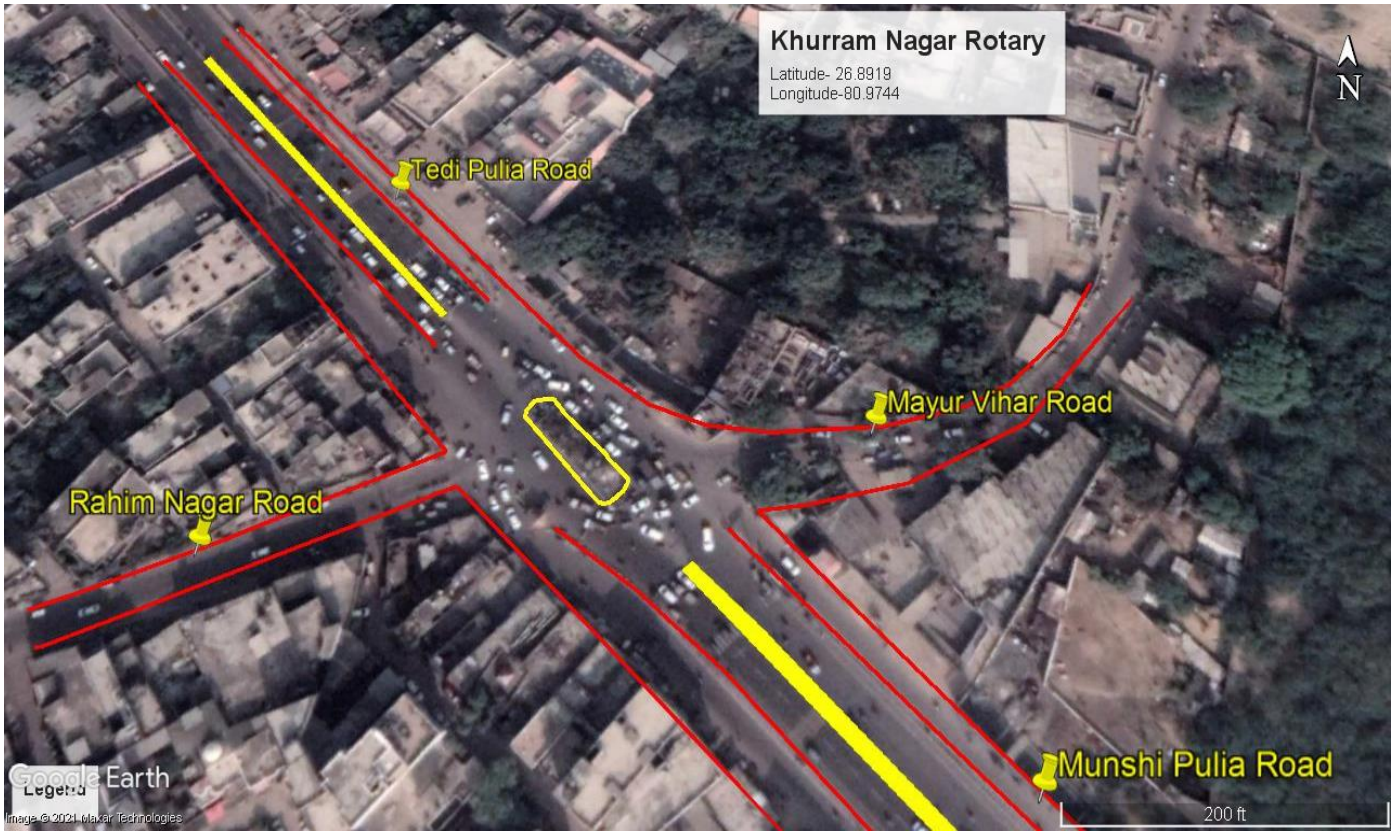
Year- 2010

Shape- Elliptical



Year- 2020

Shape- Elliptical



Conclusion and Results: As we can clearly see from the satellite image how the shape and design of intersection is changing according to the growth of traffic and surrounding area. Some findings are-

1- Shape of rotary is depend upon the traffic growth and connecting roads.
2- Firstly the shape was circular then ovel and finally it becomes elliptical.
3- In 2003 shape was circular that means all connecting legs was equally important initially.
4- In 2006 and onwards the importance of road changed and shape changes to elliptical.
5- Surrounding area is showing sprawl according to the development of roads.
6- Service lane was initially absent but later it added in the design of road.
7- The efficiency of handling the traffic increases as the design and shape of rotary changes.
8- Widening of road occurs fastly during 2006-2010.
9- The design elements of roads rapidly designed during 2010-2020 which helps for diverting and handling the traffic load.

REFERENCES

1. Kadyali L.R. and Lal N.B.: Principles and Practices of Highway Engineering, Delhi, India, 2004.
2. Metkari, M., Budhkar, A.K., Maurya, A.K. 2012 "Review of passenger car equivalence studies in Indian context". International Conference on Emerging Frontiers in Technology for Rural Area (EFITRA).
3. IRC 65-1976 Recommended practice for traffic rotaries.(December 2020)
4. Prasad N.V (2009), Central Road Research Institute (CRRI), New Delhi, "To Determine the PCU Value for different types of Vehicles".
5. Kalaga Ramachandra Rao. (2013)," Measuring Urban Traffic Congestion".
6. Sathya Narayana. PVH. (2012), "Effect of Traffic Volume, its Composition and Stream on PCU".
7. VT. Hamizh Arasan and Krishnamurthy. (2008), "Study of Traffic Volume and Road Width on PCU value of Vehicles".