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Planning and Design of Flyover at Munshi Puliya Intersection in Lucknow

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ABSTRACT: In this paper deals what are the problems occurring in high traffic intensity area at Munshi Puliya in Lucknow. The analysis influences of traffic behavior of both the structural components of highway fly over bridge systems. Additionally, it is also demonstrated that beneficial effect on the superstructure response and sometimes produce detrimental effects on the system behavior and is dependent on the characteristics of the high traffic intensity. Here I consider the place at Munshi Puliya of Lucknow to Lucknow – Faizabad Highway because there are a more traffic problems in peak hours. The proposed flyover bridge is designed to connect the roads. However, in-situ bridge traffic monitoring is still one of the rugged works for researchers in their field applications. Carry out the preliminary survey for the various alignment and finalize the optimistic alignment based an Engineering and economic aspect. Prepare alignment plans, longitudinal sections and cross sections with reference to latest IRC specification and current international best practices for these IRC specifications and current international best practices for these types of works.

KEYWORDS: Traffic volume, Survey, PCU, Peak hour, Intersection.

I. INTRODUCTION

A bridge is a construction built to span physical obstacles such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. Designs of bridges vary depending on the function of the bridge, the nature of the terrain where the bridge is constructed, the material used for construction and the funds available to build it. A bridge has three main elements. First, the substructure (foundation) transfers the loaded weight of the bridge to the ground; it consists of components such as columns (also called piers) and abutments. An abutment is the connection between the end of the bridge and the road carried by the earth; it provides support for the end sections of the bridge. Second, the superstructure of the bridge is the horizontal platform that spans the space between columns. Finally, the deck of the bridge. The guidelines for Non-linear analysis for bridge structure presents a collection of general recommendations for the modeling and analysis of highway bridges and overpasses subjected to earthquake ground motions, required for the design or evaluation of the capacity and ductility of critical bridge components and systems.

The Lucknow road map overview

Four Indian National Highways originate at Lucknow's Hazratganj intersection: NH-24 to Delhi, NH-24B to Allahabad, NH-25 to Shivpuri via Jhansi, NH-56 to Varanasi and NH-28 to Barauni. Multiple modes of public transport are available such as taxis, city buses, cycle rickshaws, auto rickshaws and compressed natural gas (CNG) low floor buses with and without air conditioning.

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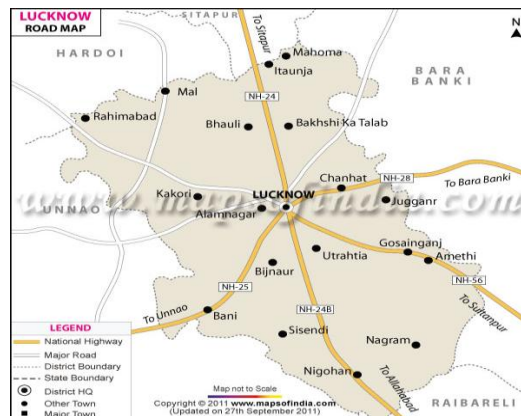


Figure 1: Road map of Lucknow

II. AIMS & OBJECTIVES

Aim

Reduce traffic congestion at Munshi Pulia Intersection, Lucknow.

Objectives:

- 1- Review the state-of-art in planning of flyover.
- 2- Assessment of base year traffic demand at Munshi Pulia Intersection.
- 3- Forecast of traffic at Munshi Pulia Intersection.
- 4- Recommendation to reduce traffic congestion at Munshi Pulia Intersection.

III. METHODOLOGY

Traffic Survey

Data Collection: Data collected with the help of 18 enumerators equipped with Android device.

Location: Location of the spot for traffic volume survey was chosen to be Munshi Pulia intersection. There were total 18 turnings comprise of 6 straight roads and 12 turnings roads.

Method

Data collection is done with Tally Marking method and Android App called Traffic Counter.

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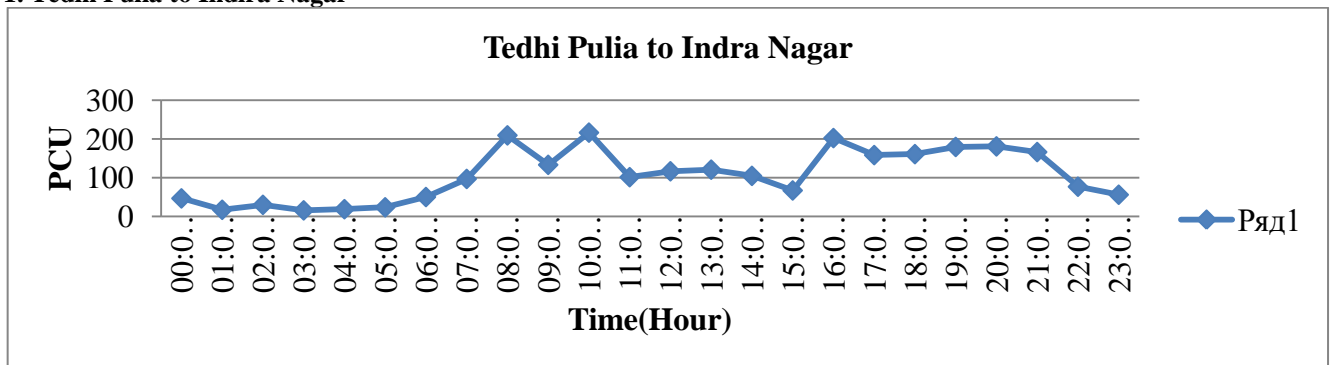
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Various directions Traffic Volume Survey at Munshi Pulia Intersection:

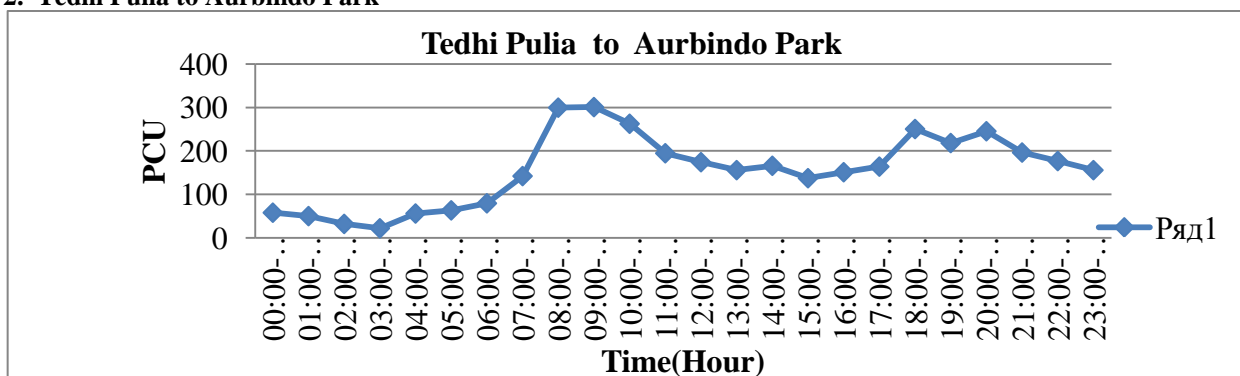
1. Tedhi Pulia to Indira Nagar



Line Graph 1

- Peak hour: 10:00 a.m. - 11:00 a.m.
- PCU at peak hour is 220 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (45%)
- Average Daily Traffic (ADT) is **2556 PCU/Day**

2. Tedhi Pulia to Aurbindo Park



Line Graph 2

- Peak hour: 9:00 a.m. - 10:00 a.m.
- PCU at peak hour is 310 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (47%)
- Average Daily Traffic (ADT) is **3752 PCU/Day**

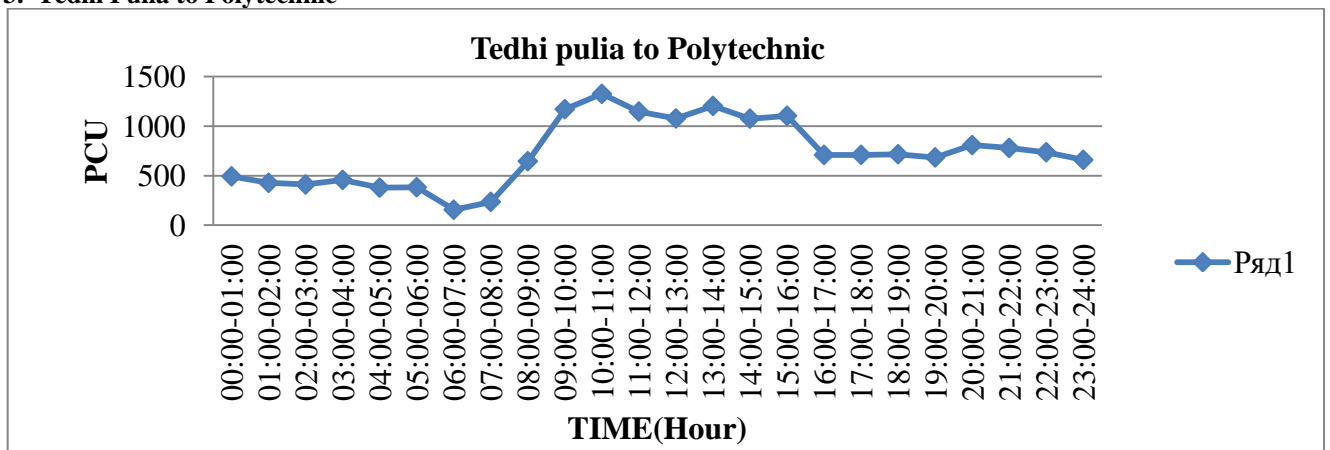
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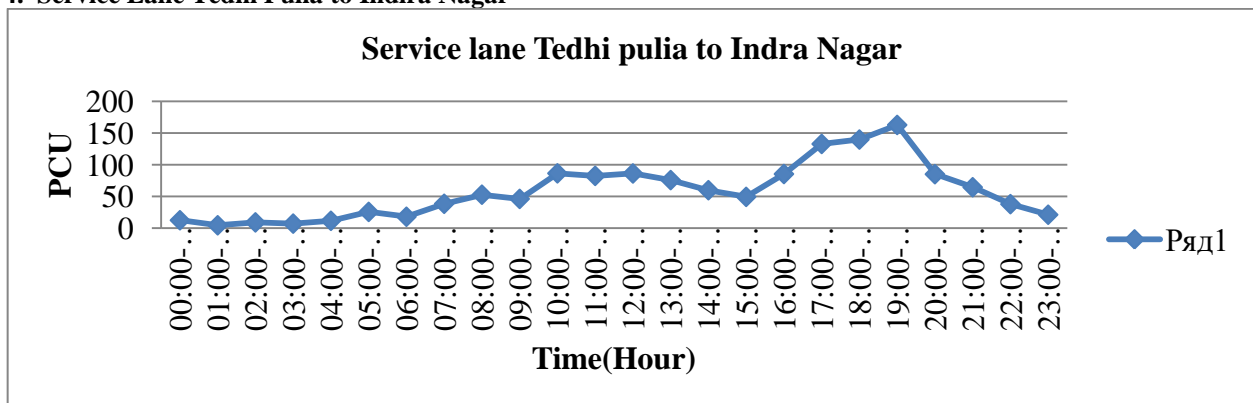
3. Tedhi Pulia to Polytechnic



Line Graph 3

- Peak hour: 10:00 a.m. - 11:00 a.m.
- PCU at peak hour is 1300 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (27%)
- Average Daily Traffic (ADT) is **17502 PCU/Day**

4. Service Lane Tedhi Pulia to Indira Nagar



Line Graph 4

- Peak hour: 7:00 p.m. - 8:00 p.m.
- PCU at peak hour is 160 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (45%)
- Average Daily Traffic (ADT) is **1398 PCU/Day**

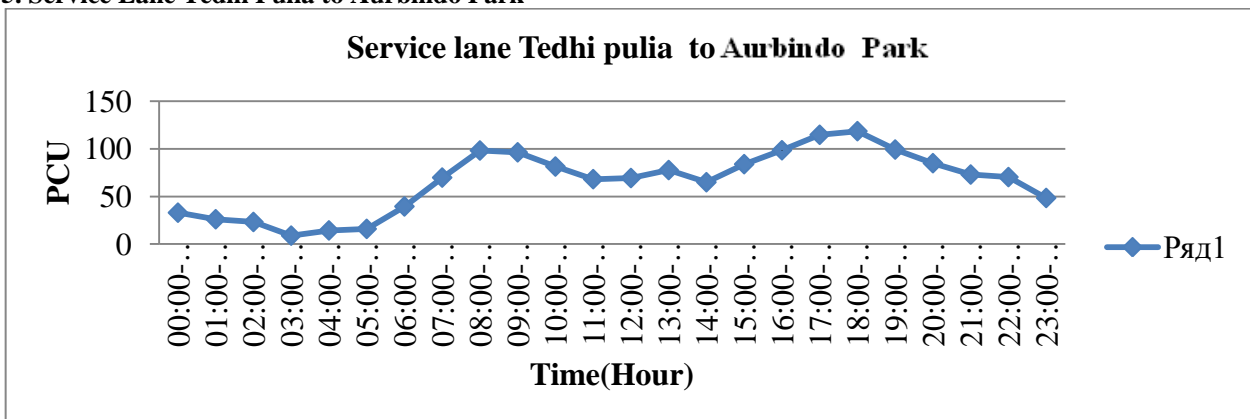
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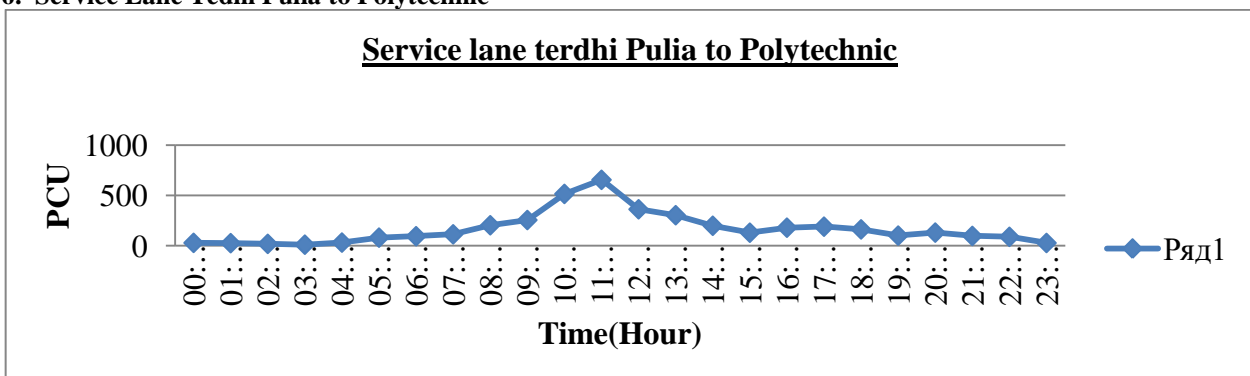
5. Service Lane Tedhi Pulia to Aurbindo Park



Line Graph 5

- Peak hour: 6:00 p.m. - 7:00 p.m.
- PCU at peak hour is 120 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (62%)
- Average Daily Traffic (ADT) is **1577 PCU/Day**

6. Service Lane Tedhi Pulia to Polytechnic



Line Graph 6

- Peak hour: 11:00 a.m. – 12:00 p.m.
- PCU at peak hour is 650 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (37%)
- Average Daily Traffic (ADT) is **3641 PCU/Day**

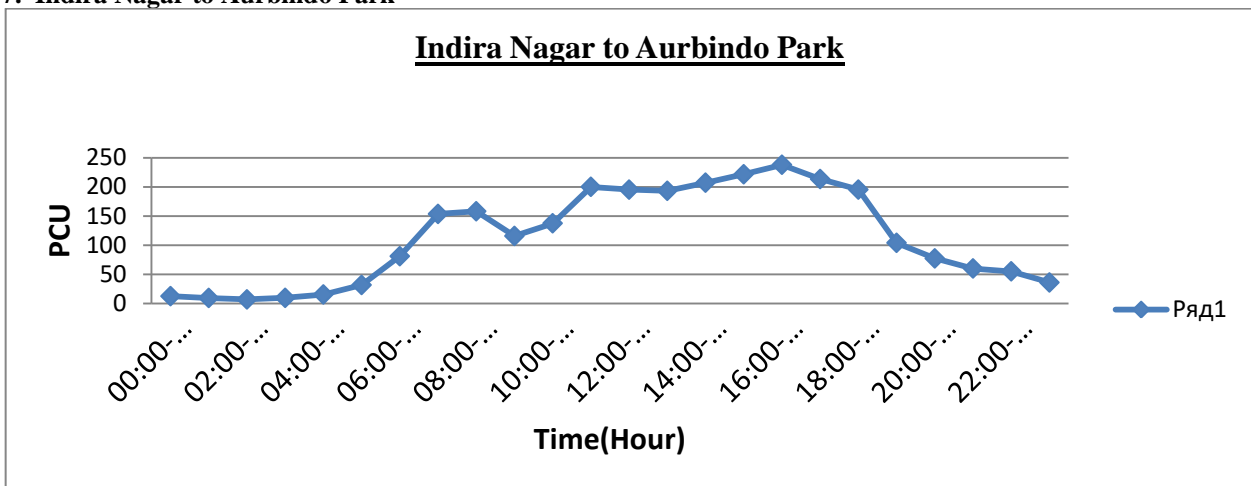
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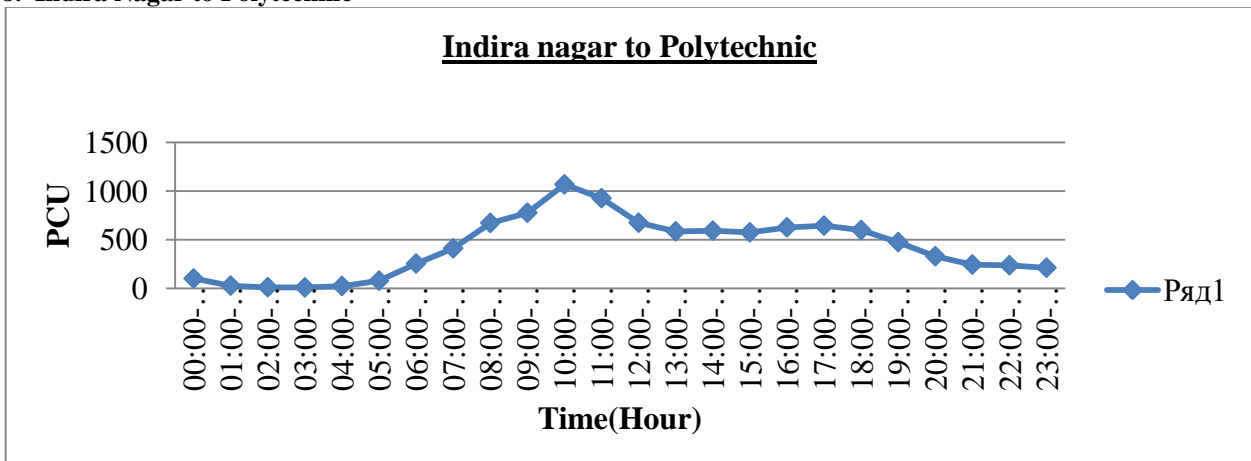
7. Indira Nagar to Aurbindo Park



Line Graph 7

- Peak hour: 4:00 p.m. - 5:00 p.m.
- PCU at peak hour is 240 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (42%)
- Average Daily Traffic (ADT) is **2730 PCU/Day**

8. Indira Nagar to Polytechnic



Line Graph 8

- Peak hour: 10:00 a.m. - 11:00 a.m.
- PCU at peak hour is 1050 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (41%)
- Average Daily Traffic (ADT) is **10160 PCU/Day**

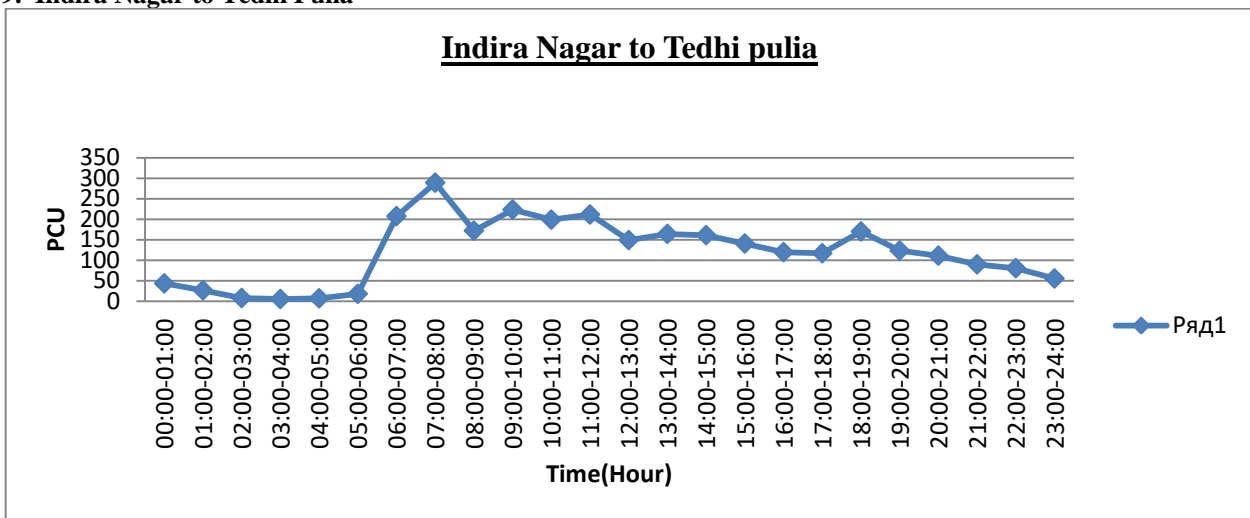
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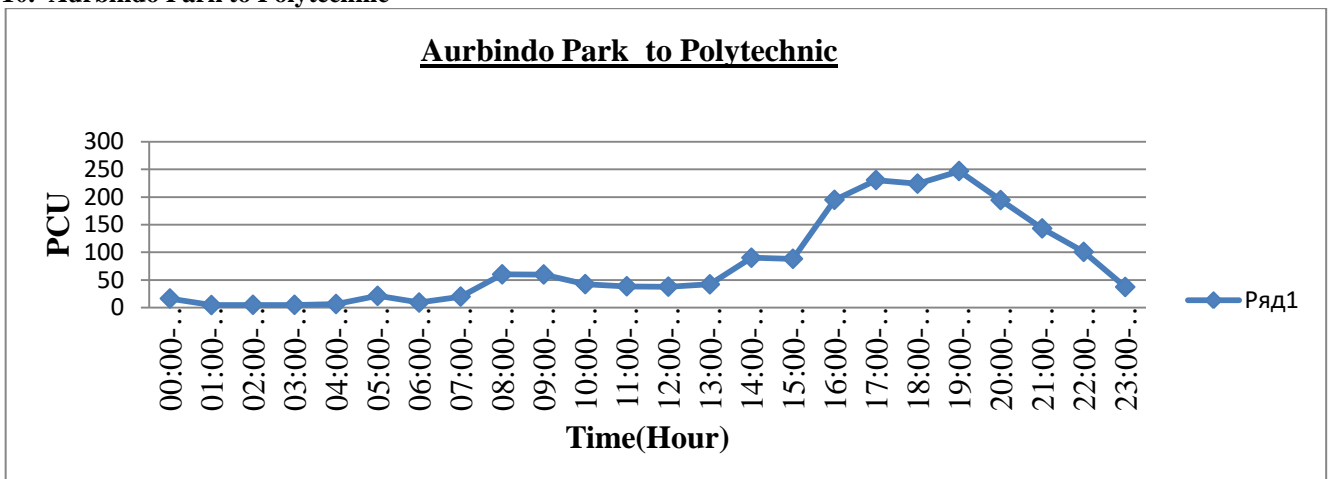
9. Indira Nagar to Tedhi Pulia



Line Graph 9

- Peak hour: 7:00 a.m. - 8:00 a.m.
- PCU at peak hour is 290 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (47%)
- Average Daily Traffic (ADT) is 2899 PCU/Day

10. Aurbindo Park to Polytechnic



Line Graph 10

- Peak hour: 7:00 p.m. - 8:00 p.m.
- PCU at peak hour is 250 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (62%)
- Average Daily Traffic (ADT) is 1920 PCU/Day

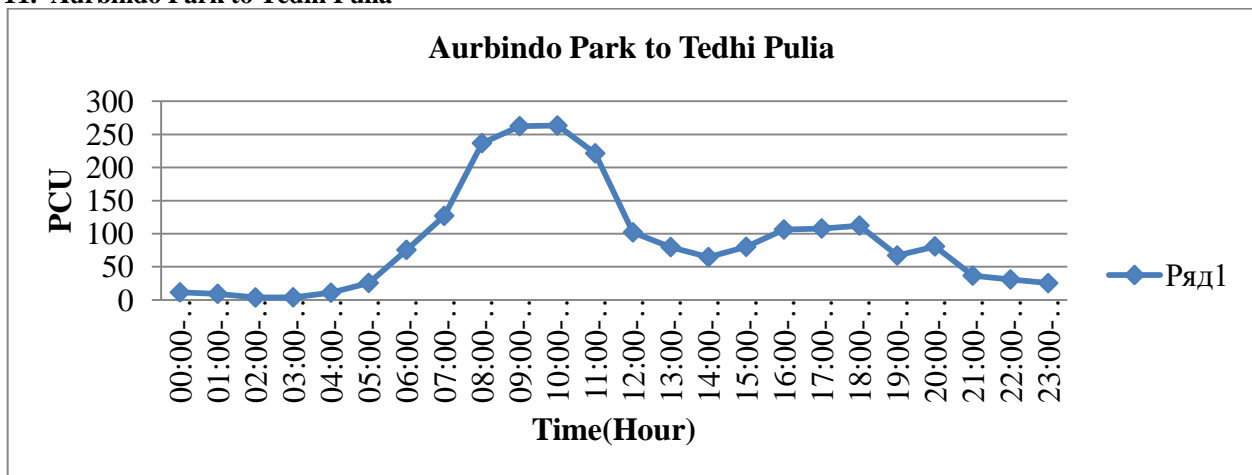
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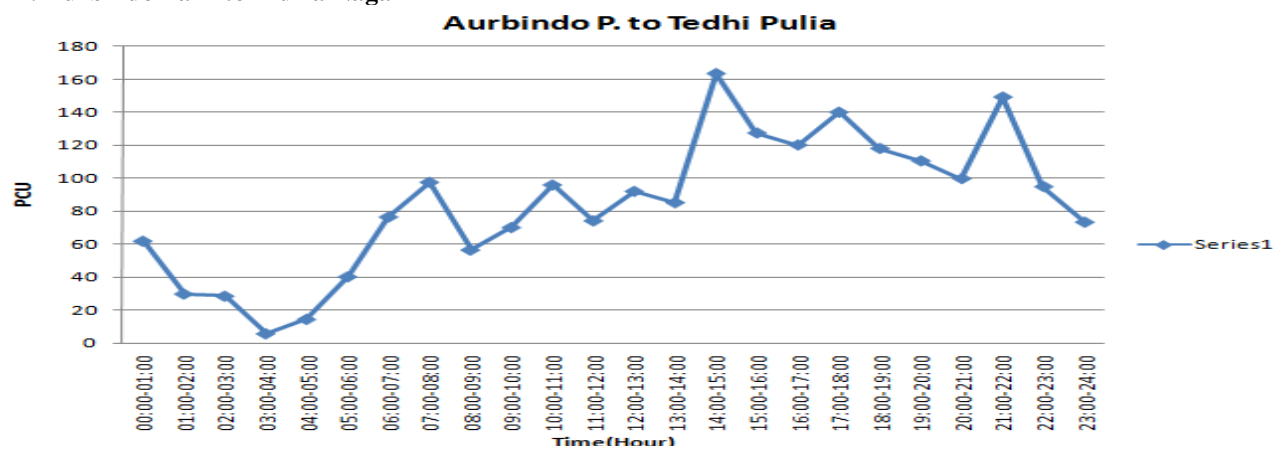
11. Aurbindo Park to Tedhi Pulia



Line Graph 11

- Peak hour: 10:00 a.m. - 11:00 a.m.
- PCU at peak hour is 260 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (56%)
- Average Daily Traffic (ADT) is **2144 PCU/Day**

12. Aurbindo Park to Indira Nagar



Line Graph 12

- Peak hour: 2:00 p.m. - 3:00 p.m.
- PCU at peak hour is 165 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (21%)
- Average Daily Traffic (ADT) is **2026 PCU/Day**

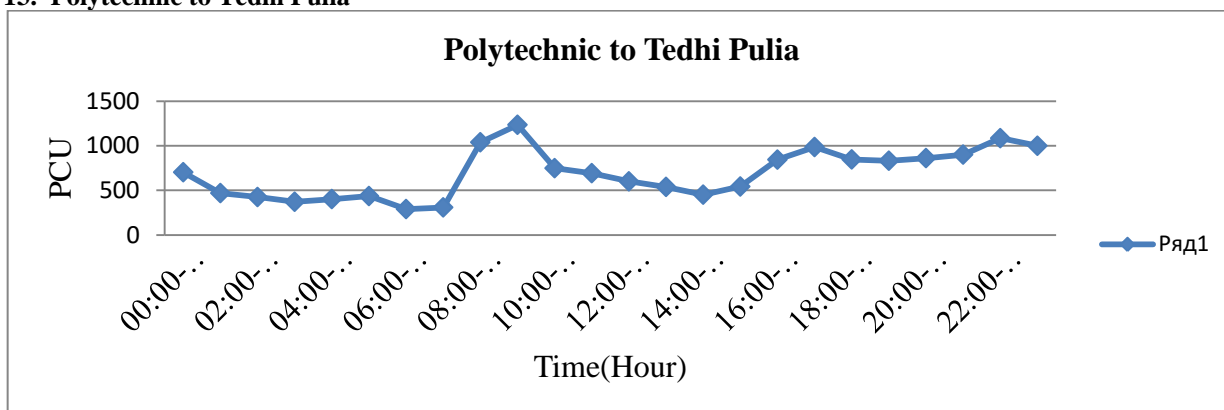
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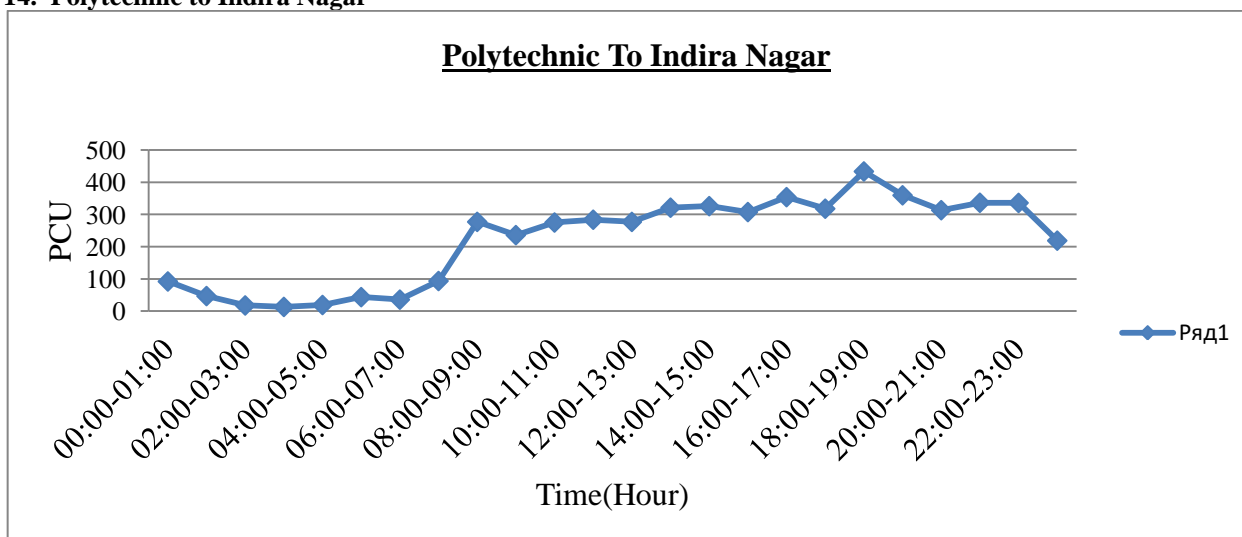
13. Polytechnic to Tedhi Pulia



Line Graph 13

- Peak hour: 9:00 a.m. - 10:00 a.m.
- PCU at peak hour is 1250 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (29%)
- Average Daily Traffic (ADT) is **16601 PCU/Day**

14. Polytechnic to Indira Nagar



Line Graph 14

- Peak hour: 7:00 p.m. - 8:00 p.m.
- PCU at peak hour is 425 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (43%)
- Average Daily Traffic (ADT) is **5335 PCU/Day**

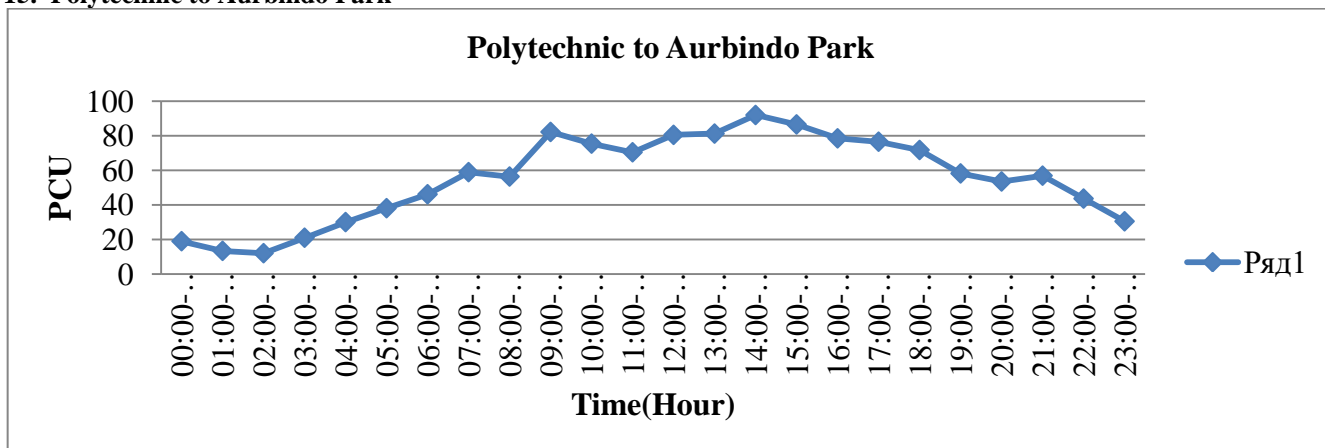
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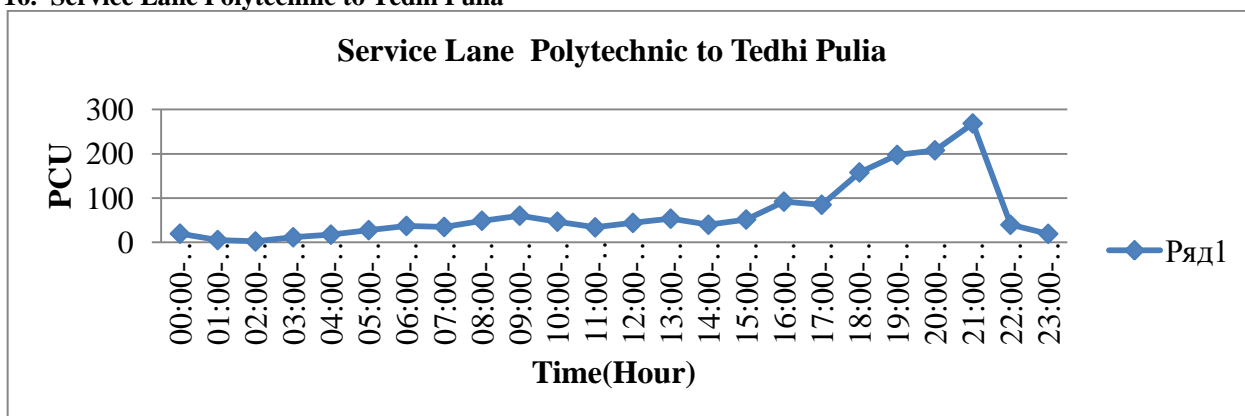
15. Polytechnic to Aurbindo Park



Line Graph 15

- Peak hour: 2:00 p.m. - 10:00 p.m.
- PCU at peak hour is 90 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (35%)
- Average Daily Traffic (ADT) is 1333 PCU/Day

16. Service Lane Polytechnic to Tedhi Pulia



Line Graph 16

- Peak hour: 9:00 a.m. - 10:00 a.m.
- PCU at peak hour is 270 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (41%)
- Average Daily Traffic (ADT) is 1597 PCU/Day

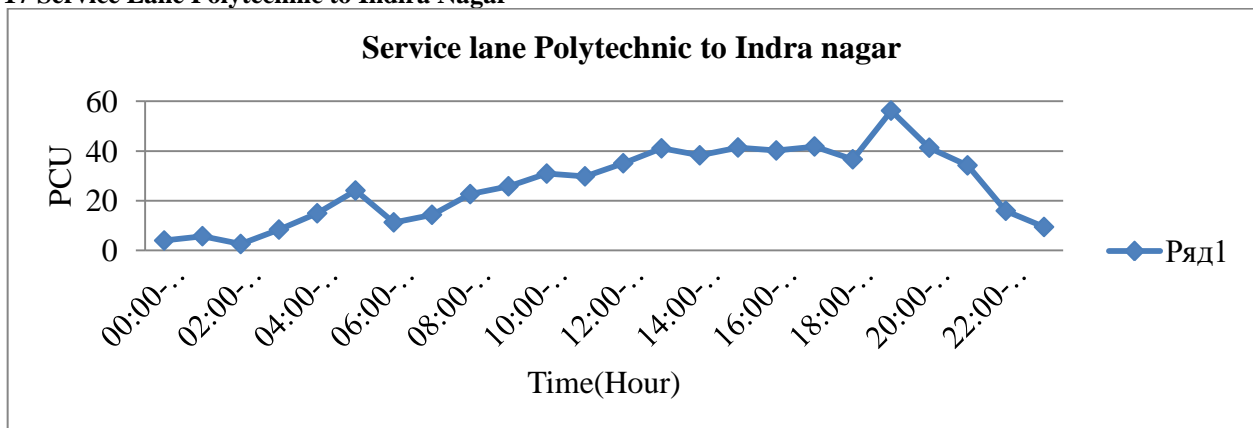
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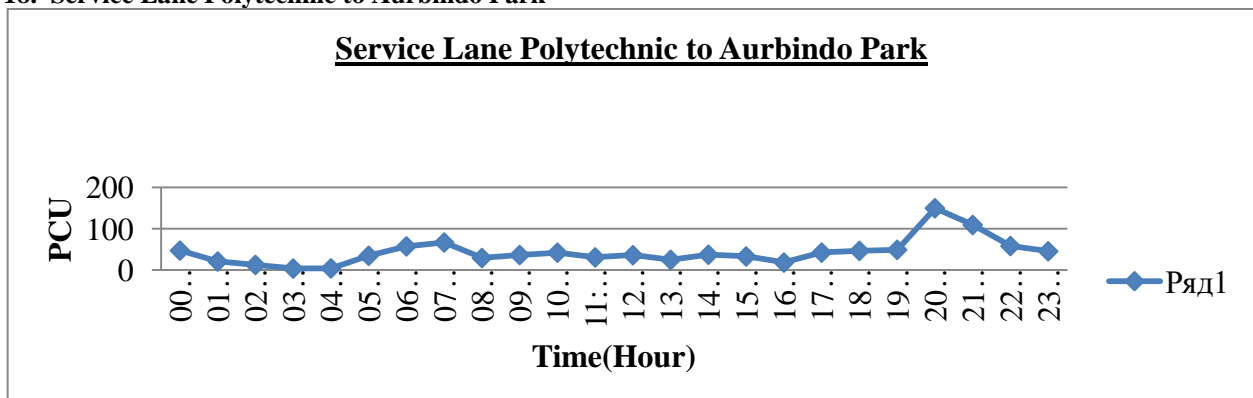
17 Service Lane Polytechnic to Indira Nagar



Line Graph 17

- Peak hour: 10:00 a.m. - 11:00 a.m.
- PCU at peak hour is 59 PCU/Hour
- Maximum percentage of road occupied by Scooter/Motorcycle (33%)
- Average Daily Traffic (ADT) is 626 PCU/Day

18. Service Lane Polytechnic to Aurbindo Park



Line Graph 18

Peak hour: 8:00 p.m. - 09:00 p.m.
PCU at peak hour is 150 PCU/Hour
Maximum percentage of road occupied by Scooter/Motorcycle (44%)
Average Daily Traffic (ADT) is 1037 PCU/Day

Date:

Data for volume study was collected on march 2,3,4 & 5 March and all are weekdays.. It was four day survey Monday, Tuesday, Wednesday and Thursday respectively.

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Time

Time of data collection for volume study:

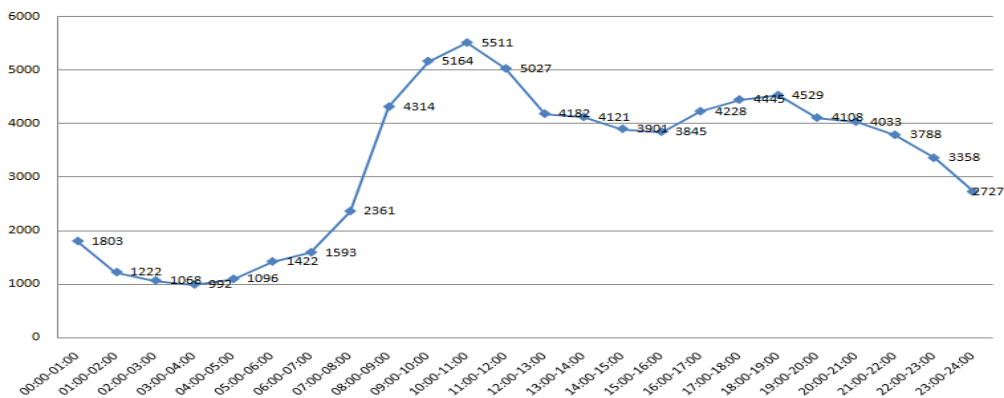
- First day timing was 10 P.M. to 6 A.M.,
- Second day timing was 8 A.M. to 4 P.M.,
- Third day timing was 4 P.M. to 10 P.M. and
- Fourth day timing was 6 A.M. to 8 A.M.

IV. RESULTS FROM SURVEY

According to the graph between PCU and time interval from following sheet-

- Peak hour: 10:00 a.m. - 11:00 a.m. with 5511 PCU/Hour
- The max ADT at route (Tedhi Pulia to Polytechnic) i.e. 17502 PCU/Day
- PCU at peak hour is 5511 PCU/Hour
- Total traffic volume through Munshi Pulia Intersection is 78835 PCU/Day

Graph showing the variation between PCU and time period (Hour)
Combined Traffic Volume Graph



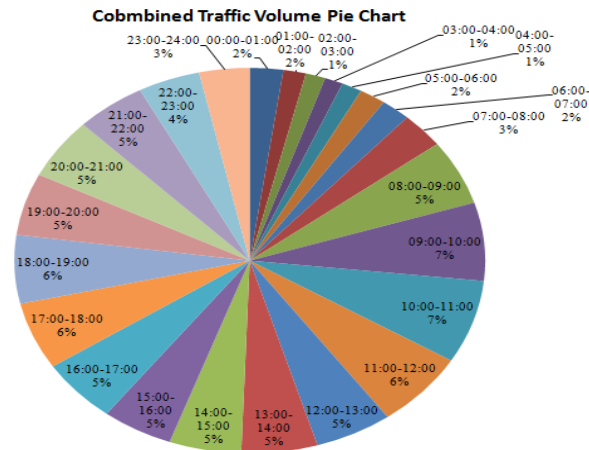
Line Graph 19

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V. CONCLUSION

The PCU at the peak hour is **5511 PCU/Day** and Total traffic volume through Munshi Pulia Intersection is **78835 PCU/Day**.

Our project “Planning and Design of Flyover at Munshi Pulia Intersection” emphasis that the construction of Flyover is necessary at Munshi Pulia Various outcomes can be concluded as follows :Intersection as the capacity of rotary comes out to be and the traffic flow through rotary is 2844 PCU/Hour, 3508 PCU/Hour respectively, which exceed the capacity of rotary.

Future forecast of vehicle traffic volume at Munshi Pulia Intersection is also exceeding 10000 PCU/Hour in year 2025. The fatal accident at the intersection is also more than 8.

Hence considering the above conclusion flyover is required at Munshi Pulia intersection.

Recommendation

Length and width of flyover should 526 and 16.76 metre respectively. Number of lanes on flyover should be 4 (two lane each side) from Tedhi Pulia to Polytechnic direction and vice-versa for the uninterrupted traffic movement of National Highway NH-24 A.

Footpath and Zebra crossing is also recommended at intersection for pedestrian safety.

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10.2 Traffic Movement around Rotary

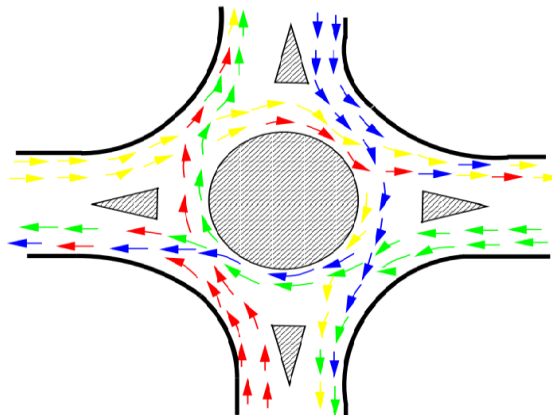


Figure: 2 Traffic operations in a rotary

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