

Comparative Analysis on Efficiency of Signal on Four Arm Junction using Various Methods

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Abstract – Management of traffic is a major problem at all busy junction. Increasing growth of traffic causes congestion, road accident, delay, and conflict for monitoring and control road traffic at an four arm junction is a major task to achieve the capability of signal to flow traffic in smooth ways and upgrade of traffic performance in terms of safe and efficient flow of traffic at four arm junction makes signal capable and the major problems like delay, accident, conflict, congestion can be minimized by doing proper survey of traffic. This research paper mainly focused on redesign of existing signal by collecting present traffic volume data to check its capability for flow of traffic if the existing signal timing and redesign signal timing is same than we say that the signal is capable to flow of traffic if both are not same than we recommend to design signal timing to make four arm junction signal efficient the procedure we use to design the signal is trail cycle method and IRC method.

KEYWORDS: Traffic Junction, Capability, Timing, Design, Flow.

1. INTRODUCTION

Due to increase in the uses of vehicle causes increase in traffic on road which causes traffic flow conflict and if it increase beyond certain limit at a junction then the resulting delay increase increase to unacceptable limits and at same time possibility of an accident also increase. To manage this kind of situation we need to have efficient traffic signal on four arm junction which makes traffic movement easy and capable to flow heavy traffic.

1.1 Objective

- 1) Analysis the efficiency of existing traffic signal on four arm junction to know its efficiency.
- 2) Providing actual signal timing for Red, Green, Amber as per existing traffic signal survey by calculation of three method.
- 3) Comparison of method which is most reliable and useful.
- 3) By taking present survey data of existing traffic signal we redesign the signal timing to verify its efficiency.

2. LITERATURE REVIEW

2.1 D. Nikhil, M Anil, E pramod, B suresh, published researched paper on design of traffic signal and pedestrian signal at gandimaismma intersection, Hyderabad. Case study by using various method of traffic signal design (2019).

2.2 Sanjay Singh, Siteeshkumar Singh. (B.tech civil Engineering) career point university kota, Rajasthan gives research papaer on traffic volume survey analysis of the road connectivity career point university (2016).

3. METHODOLOGY

To determine the capability of signal on four arm junction procedure involves following steps:

3.1 Selection of four arm junction.

The selected four arm junction which considered and served traffic volumes are as follows:

Omkar nagar square traffic signal four arm junction

3.2 Data collection Analysis and survey of traffic.

Analysis timing of signal and survey of traffic volume by manual method on each direction of signal. Analysis is done on day and night in both peak hours.

Morning traffic survey time 10:00 to 12:00.

Night traffic survey time 6:00 to 8:00. 15 min interval vehicle traffic count is also taken.

3.3 Manual Survey

By doing manual survey on this four arm junction on every day Monday to Sunday the traffic volume count is taken.

3.4 Design of Signal Time by Various Methods

After Data collecting traffic volume from each signal the signal time should be design on the basis of present data by three method that is approximate method, trail cycle method, IRC method and then compare with the existing signal to know that whether the signal is efficient or not and comparison of method to know which method is most reliable and useful and accurate.

3.5 Determination of Signal Efficiency

If my analysis data of signal time is same on existing signal than the signal is efficient. If not than we recommend to design the signal time of inefficient four arm junction.

Existing traffic signal timing survey of Omkar Nagar square.

Morning timing	Red signal time	Amber signal time	Green signal time
Besa road to Naik nagar	90Sec	3Sec	30Sec
Naik road to Besa nagar	90Sec	3Sec	30Sec
Manewada to shatabdi square	105Sec	3Sec	20Sec
Shatabdi square to manewada	105Sec	3Sec	30Sec

Night timing	Red signal time	Amber signal time	Green signal time
Besa road to Naik nagar	90Sec	3Sec	30Sec
Naik road to Besa nagar	90Sec	3Sec	30Sec
Manewada to shatabdi square	105Sec	3Sec	20Sec
Shatabdi square to manewada	105Sec	3Sec	30Sec

After data analysis and calculation of traffic volume count of signal of Omkar nagar, Trial cycle method, and IRC method we design red, green and amber timing for signal which is mention below.

Calculation and analysis timing by Trial cycle method.

Morning timing	Red signal time	Amber signal time	Green signal time
Besa road to Naik nagar	85Sec	3Sec	25Sec
Naik road to Besa nagar	85Sec	3Sec	25Sec
Manewada to shatabdi square	100Sec	3Sec	20Sec
Shatabdi square to manewada	100Sec	3Sec	20Sec

Night timing	Red signal time	Amber signal time	Green signal time
Besa road to Naik nagar	85Sec	3Sec	25Sec
Naik road to Besa nagar	90Sec	3Sec	25Sec
Manewada to shatabdi square	100Sec	3Sec	20Sec
Shatabdi square to manewada	100Sec	3Sec	20Sec

Calculation and analysis timing by IRC method.

Morning timing	Red signal time	Amber signal time	Green signal time
Besa road to Naik nagar	87Sec	3Sec	29Sec
Naik road to Besa nagar	87Sec	3Sec	29Sec
Manewada to shatabdi square	105Sec	3Sec	20Sec
Shatabdi square to manewada	105Sec	3Sec	20Sec

Night timing	Red signal time	Amber signal time	Green signal time
Besa road to Naik nagar	87Sec	3Sec	29Sec
Naik road to Besa nagar	87Sec	3Sec	29Sec
Manewada to shatabdi square	105Sec	3Sec	20Sec
Shatabdi square to manewada	105Sec	3Sec	20Sec

4. DISCUSSION

In the research when I start collecting data of signal on four arm junction in both peak hours at morning (10:00 to 12:00) and at evening (6:00 to 8:00) in that I also take 15 min traffic counts on two roads of such junction name are Omkar nagar, in which the flow of traffic on junction is high. After surveying data of one month, I design a signal timing on the basis of surveyed data for the same junction to check its capability. After designing the signal timing I compare signal time to existing signal and present signal time which design by me. In that I found about Omkar nagar square signal of four arm junction on both peak hours is capable to flow heavy traffic which is not recommended to change signal timing or no need to redesign signal timing. I notice that

people were not following traffic rules which result to make capable signal to inefficient.

5. CONCLUSIONS

1) It is recommended that, at Omkar nagar square Junction, which found capable to flow heavy traffic is no need to redesign signal time as it found efficient.

2) Comparison between two method IRC method and trial cycle method the IRC method is most reliable and accurate and time consuming method as compare to trial cycle method.

6. REFERENCES

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