



SINGLE POINT URBAN INTERCHANGE (SPUI)

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Abstract

The most commonly cited advantages of single point urban interchanges are improved operation efficiency and safety as well as reduced right-of-way requirements compare to other interchange forms. Left turning traffic from both directions of the intersecting roadways are able to turn simultaneously without crossing the path of the opposing left turns. Because traffic passing through the interchange can be controlled by a single signal, vehicles can clear the intersection much more quickly than in a diamond interchange. SPUIs also allow for wider turns easing movement for large vehicles such as trucks and RVs. For the more, a SPUI takes up considerably less space than a full cloverleaf interchange, allowing constructions to take place on a limited amount of property and minimising state use of eminent domain.

Index Terms: Single Point Urban Interchange(SPUI), licence Plate Survey, Passenger Car Unit (PCU), Traffic Congestion, Rail Crossing.

I. INTRODUCTION

Most of this traffic occurs on our freeway system and a majority of all congestion-related problems occurs at interchanges between limited and full access highways – the service interchanges. One of the common solutions to this traffic problem is to construct Diamond interchanges. Diamond interchanges serve well only in low volume conditions and as the volumes increase problems related to congestion increase. Since the Diamond interchange has two intersections

located close to each other, it requires a large amount of right of way.

SPUI offers improved traffic-carrying capacity, safer operation and reaches destination point in less time. This interchange has been called the Single Point Interchange. Urban interchanges, Single-Point, Diamond, Compressed Diamond, Urban Grade Separated and the Single Point Urban Interchange (SPUI) mainly because of its peculiar geometry. SPUIs are usually used in urban areas with large traffic volumes. The SPUI is a grade-separated interchange that converges all the movements into one signalized area.

II. OBJECTIVES OF THE STUDY

- Collection of various data at selected location.
- To device a methodology, to analyze the collected data.
- To provide an appropriate data analysis and efficient control strategy for the existing traffic conditions.
- To achieve free movement of pedestrians and vehicles, with fewer interruptions and at higher overall speeds.
- Less conflict between traffic movements reduces the capacity for accidents.
- To help move large volumes of traffic through limited amounts of space safely and efficiently reducing time.
- Develop a transportation system that respects and enhances the natural and built environment.
- Support an open, inclusive and participatory transportation planning process.
- Proposing scientific approach for smart city.

III. STUDY OF EXISTING TRAFFIC PROBLEMS:

This location is the fast developing residential locality and also in the close proximity to the railway station. The current scenario observed from this junction reveals that the road section is of two lane carriageway. One of the roadways actually has a railway crossing. The intersection of mixed traffic flow and road the pattern is facing maximum traffic during peak hours. It is an unsignalized intersection which is controlled by Traffic Police Officers only during peak hours. Both sides of the roads are occupied by commercial buildings irrespectively these leads to on-street parking resulting in occupying the shoulders at their edges causing congestion.

- Traffic congestion
- Increase in number of vehicles
- Shortening of life span of existing road due to more vehicle growth factors
- Increase in number of major road accidents

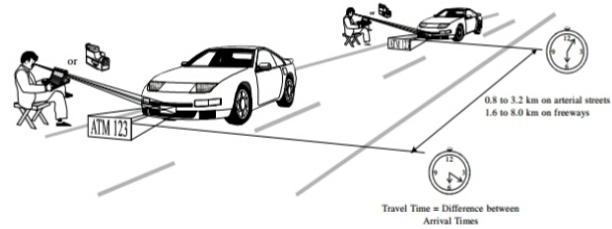


Fig: The traffic congestion due to closing of the Railway Gate (Morning Peak Hours)



Fig: The traffic congestion due to closing of the Railway Gate (Evening Peak Hours)

IV. LICENCE PLATE METHOD OR REGISTRATION NUMBER PLATE SURVEY:



Registration number plate survey consists on noting the registration numbers of the vehicles entering or leaving an area at survey points located on the cordon lines. By matching the registration numbers of the vehicles at the point of entry or exit from the area, one is enabled to identify two points on the paths of the vehicles. The method neither gives the origin or the destination of the trip nor yields any other useful information such as trip purpose. The advantages of the method are that the work does not interfere with the traffic in any way. However, a large number of observers are needed and analysis of the results can be complicated.

Time Period	Road Segment	Collected Plates	Audited Matches	Percentage
1000-1200	Railway Station - 3 rd Gate	651	573	88.05%
1600-1800	Railway Station - 3 rd Gate	553	462	83.54%
1000-1200	3 rd Gate - Railway Station	746	612	82.03%
1600-1800	3 rd Gate - Railway Station	622	510	81.96%

NUMBER OF OBSERVERS:

The number of observers needed to count the number of vehicles depends upon the number of lanes of the road on which the count is to be

- As there is more construction works, the cost is more in case of a flyover.
- Area required for a flyover is more as compared to SPUI.
- Construction period is more in the case of a flyover as compared to the SPUI.
- The current location is not ideal for a flyover. Hence we conclude that SPUI is the ideal choice for the Intersection.

VII. RESULTS AND CONCLUSION

- The LOS of the highway can be increased by providing a single point urban interchange at that intersection.
- To satisfy the present and fulfill future demands of the traffic SPUI is the ideal choice.
- For orderly movement, separate left turning and right turning manoeuvre can be provided.
- The capacity of road (vehicles per km) can be increased.
- To provide easy, fast and safe access of public transportation service.
- To reduce the congestion of traffic in a particular area.
- To minimize the number of accidents.
- To reduce the travel time of vehicle or road user.
- To help move large volumes of traffic through limited amounts of space safely and efficiently reducing time.
- To achieve free movement of pedestrians and vehicles, with fewer interruptions and at higher overall speeds.

VIII. FUTURE SCOPE

The increasing congestion on urban roads presents serious threats to the economic growth and livability of our city regions. Road traffic congestion is a central problem in most developing regions. Most urban areas have poorly managed traffic networks with several traffic hotspots of potential congestion areas. We have studied the traffic movement at the intersection and the problems arising. Due to this there is no free movement of vehicles at the intersection. Therefore an analytical study was carried out and analysed solution is to providing Single Point Urban Interchange (SPUI). SPUI is most suitable for the present location. It

helps in reducing traffic congestion, consumes lesser travel time and avoids accidents. It also provides safe and comfort riding to the driver. Based on this study further design process can be carried out in providing SPUI.

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