e-ISSN:2582-7219

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 6, Issue 5, May 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.54

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 5, May 2023 |

Design of Intersection using Traffic Control System: Navale Bridge

Chavan Kiran Yuvraj[*1], Chaudhari Vivek Rajendra*2, Jadhav Ajit Sanjay*3, Katta Sachin Sanju[*4], Paygude Shubham Sanjay[*5], Prof. Prajwal Jaywant Gaikwad[*6]

Student, Department of Civil Engineering, Savitribai Phule Pune University, Rajgad Dnyanpeeth Technical Campus, Pune, Maharashtra, India[*1,2,3,4,5]

Project Guide, Department of Civil Engineering, Savitribai Phule Pune University Rajgad Dnyanpeeth Technical Campus, Pune, Maharashtra, India[*6]

ABSTRACT*:* Safety management of traffic to reduce or eliminate accidents, is the other critical reason for traffic control. An airline pilot needs to be warned of high winds at the destination airport just as an automobile driver needs to be warned of a dangerous curve or intersection ahead. Traffic control has as its principal objective to manage the movement of people and goods as efficiently and safely as possible. In road traffic, intersections with traffic lights (i.e., green, amber, and red indications) will often add a separate lane with a lighted green arrow to allow left turns with no opposing traffic. This frequently results in longer non green periods at the intersection, causing an increased delay and a reduction in efficiency and mobility. Traffic control system will always have to satisfy the conflicting goals of safety and mobility. For these elaborate operational procedures, rules and laws, and physical devices (e.g., signs, markings, and lights) are few of the components of any traffic control system.

KEYWORDS: Safety management, Traffic control, traffic light.

I. INTRODUCTION

Traffic is the movement of people and goods from one location to another. The movement typically occurs along a specific facility or pathway that can be called as guide. It may be a physical guide way, as in the case of a railroad, or it may be a designated route, marked either electronically as in air travel or geographically as in the marine industry. Modes of transportation, can be broadly characterized as road, rail, air, and maritime.

Traffic evolves because of a need to move people and goods from one location to another. One of the principal challenges in traffic control is to accommodate the traffic in a safe and efficient way. Efficiency can be thought of as a measure of movement levels relative to the objectives for a particular transportation system and the finances required for its operation. For example, a railroad can be thought of as efficient if it can accommodate the travel requirements of its customers at the least cost. It will be thought of as inefficient if an alternative (e.g., a trucking service) can also meet customer needs but at a lower cost.

1. 1 Transportation Engineering

In the society of today the road network is of great importance. As cities grows so does the needs of transportation and thi puts an increased pressure on the infrastructure. Thus it is of great importance to have a reliable and redundant infrastructure for the traffic, to make sure that it works even bad conditions. There are several different hazards which may have an impact on the road infrastructure such for example natural catastrophes, accidents or failure of parts of road network. Since the different infrastructure get more and interwined in the society of today and the society becomes more vulnerable for catastrophes, these hazards might have effects on other infrastructure system as well. Thus more and more researches start to look at the risk of possible cascades consequences in interconnected networks.

Transport planning has been historically concered with travel behaviour and the transportation system has been nominally ‘typical’ conditions under which the networks were designed for certain demand and certain capacity. In the past insufficient consideration has been given to the robustness and associated reliability of road networks.

1. 2 Traffic Engineering

Traffic engineering is the branch of transportation engineering that uses engineering techniques to achieve the safe and efficient movement of people and goods. It focuses mainly on research and construction of immobile infrastructure necessary for this movement, such as roads, railway tracks, bridges, traffic signs and traffic lights.

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 5, May 2023 |

1.2.1 Traffic Congestion

A system is said to be congested when the demand exceeds the capacity of the section. Traffic congestion can be defined in following two ways:

Congestion is the travel time or delay in excess of that normally incurred under the light or free flow traffic condition.

Unacceptable congestion is travel time or delay in excess of agreed upon norm which may vary by type of transportation facility, travel mode, geographical location, and time of the day.

Traffic congestion may be of two types:

a. **Recurrent Congestion:** Recurrent congestion generally occurs at the same place, at the same time every weekday or weekend day.

b. **Non-Recurrent Congestion:** Non-Recurrent congestion results from incidents such as accident or roadway maintenance

1. 3 Elements of Traffic Control System

1. Introduction

The elements of traffic control system plays important role to make the city as a smart city. To regulate road traffic & design efficient & economic traffic system there are three main components:-

1. Traffic sign
2. Traffic Signal
3. Traffic Markings

The various types of signs are available to control the traffic or to maintain the traffic flow. Because for unknown place the basic guide signs are more useful to give an idea to the road user. The traffic signal are plays very important role to control the traffic system, reduces congestion and improving safety to the road user. Common Definitions and Notations

The common definitions and notations which are used to understand the signal design are as follows.

1. **Cycle:** A signal cycle is one complete rotation through all of the indications provided.

1.3.1.1 **Cycle length:** Cycle length is the time in seconds that it takes a signal to complete one full cycle of indications. It indicates the time interval between the starting of green for one approach till the next time the green starts. It is denoted by C.

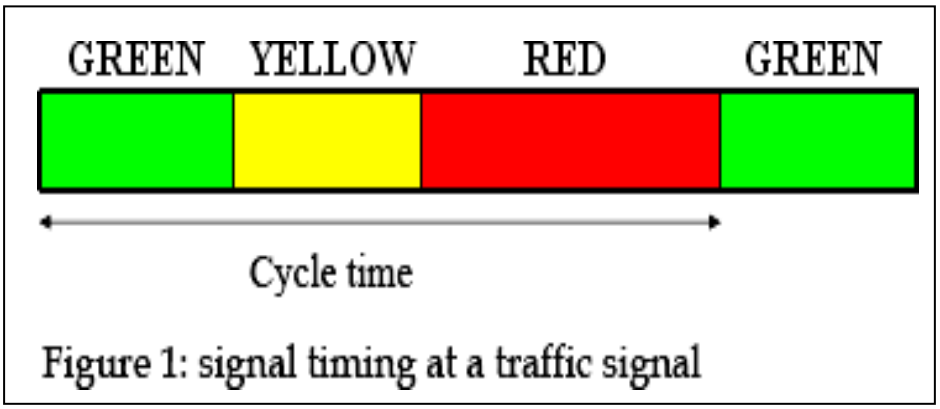


Figure 1signal cycletime

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 5, May 2023 |

II. METHODOLOGY

2.1 Design of Traffic Signal

The design hour traffic volumes in pcu / hr collected can be tabulated

As per the roadway width time taken for pedestrian to cross the street is calculated. If there is a large width of streets it is desirable to have a central pedestrian refuge of at least 1m width. Time that will be needed by pedestrian to reach the pedestrian refuge from the kerb will then be:

Time = Distance/velocity

= X seconds

This will be the pedestrian clearance interval during which no signal is displayed to the pedestrian and those who have just left the kerb or the central refuge before the termination of the pedestrian green signal can reach safely the central refuge of the kerb as the case may be. The pedestrian clearance interval is followed by amber of the next vehicular phase and by the red signal in pedestrian phase.

III. DATACOLLECTION

3.1 Detail of Location

3.12Navale Bridge, Pune

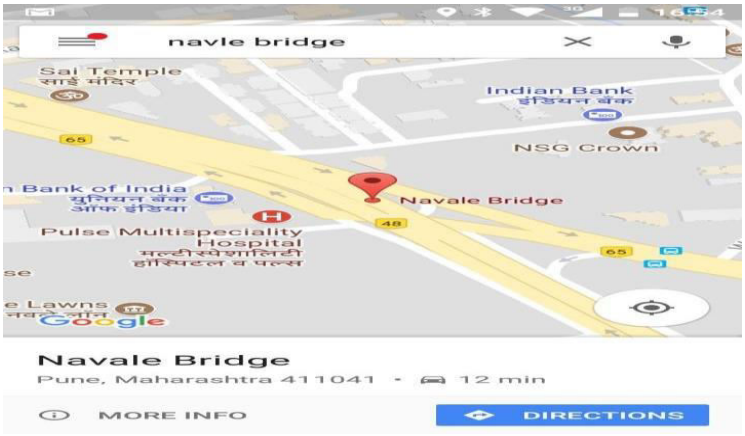


Figure2 map location of site

Figure3 Site location of navale bridge

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 5, May 2023 |

Figure 4 Group photo while collecting Data at Navale bridge

Figure5Group photo while collecting Data at Navale bridge

3.1 Design of Traffic Signal At Navale Bridge (Pune)

The design hour volumes in PCU/hr collected are as follows

From	N			E			S			W		
To	W (L)	E (S)	S (R)	S (L)	W (S)	N (R)	W (L)	N (S)	E (R)	N (L)	E (S)	S (R)
PCU/hr	-	2220	520.5	113.5	1890.5	-	-	936.5	611.5	-	-	-

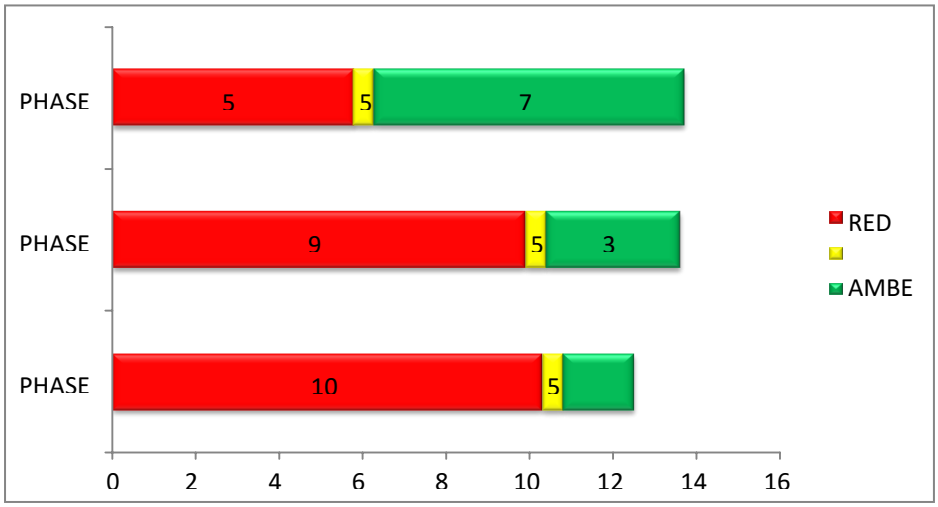
Table No. 1Design hour volumes in PCU/hr at Navale Bridge

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 5, May 2023 |

FROM	E		N		S	
TO	S(W)	L(S)	S(S)	L(E)	S(N)	R(E)
PCU/hr	1890.5	113.5	520.5	2220	936.5	611.4
Correction for leftturn		28.375		555		
Correction for rightturn						458.55
Total	1890.5	141.875	520.5	2775	936.5	1069.95
Q	2032.375		3295.5		2006.645	
S	7507.5		7507.5		7507.5	
Y=q/S	0.27		0.43		0.26	

Table2Correction added table for calculations of navale bridge



Graph1.Cycletimeof Navale bridge

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 5, May 2023 |

IV. CONCLUSION

In this work following parameters of traffic control system are studied

1. Traffic signs
2. Traffic signal
3. Traffic marking
4. Intelligent traffic system

And also decided location at different point such as Navale Bridge chowk, Datta nagar Chowk, for that I am going to study the traffic congestion in Pune city making a smart city. Following table shows the cycle time that have been calculated according to the data counts that was collected through the survey, the traffic signal is economical as compared to the construction of bridges at the location, also the construction is difficult at these locations. The signal also eliminates the problem of congestion at these locations as it will efficiently manage traffic flow.

Locations	Phases	GreenTime(Seconds)
NavaleBridge	Phase1	75
	Phase2	32
	Phase3	16
DattaNagar	Phase1	31
	Phase2	33
	Phase3	26
	Phase4	30

Table No.1 Conclusion Table

REFERENCES

1. Dr. Tom V. Mathew, IIT Bombay, “Transportation engineering”, Chapter no.34.
2. “Designprincipleoftrafficsignal,InternationalJournalofModelingandOptimization”,Vol. 3, No. 2, April 2013.
3. “ModelingandSimulationofUrbanTrafficSignalsInternational”,JournalofAdvancesinEngineering&Technology,Nov 2011©IJAET ISSN:2231-1963.
4. “DesignAndSimulationsofanIntelligentTrafficControlSystem”,TrafficSignsManual 2013London: TSO, Fourth edition2013.
5. John. A. Endler , “Signals, signal conditions & the direction of evolution”, Vol.139,march 1992.
6. Yin ZHU, Junli Wang “RESEARCHONURBANTRAFFICINTELLIGENTINTEGRATEDSYSTEM”, 2005, Vol. 6, Pp. 2349-2364
7. Y.Dakhole&Mrunalini.P.Moon.,“DesignofIntelligentTrafficControlSystemBasedon ARM”, Aswini. Vol.1, Pp-220-230,Nov.2013.
8. Dr.L.R.Kadiyali,“TrafficEngineering&TransportPlanning,KhannaPublication”

Impact Factor
7.54

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com