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U-Loop Design Traffic

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***Abstract*: This project represents the development of a U-loop traffic sensor device that can detect the vehicles under miscellaneous and without lane traffic conditions. The present available loop systems are only fit for lane based and similar traffic conditions. The evolved combined loop system has a new loop structure that can determine heavy vehicles like bus, dumper, truck etc., as well as minor vehicles like bicycle, bike, etc., taking up any available space in the road. The planned system detects, separates the vehicle type and calculate the number of vehicles even in miscellaneous traffic flow condition U-Loop is a new creative form of taking U-turn and crossing system of motor vehicles. If this method is practiced, there will remain no need of existing signal system on roads to control traffic. All the circles for road crossing will be shut. Vehicles will change their directions from ahead or later the prior crossing point. We detect and experience that one of the main reasons of traffic barrier in city is the frequently current traffic signal crossing system. If there is a circle where four directions of roads are connected there it takes 4times extra to cross that circle and even then, generate far terrible situation.**

***Keywords*: Dwarka circle, Traffic, U-turn, U-loop.**

1. Introduction

In order to facilitate the judgments of existing and coming times traffic demands, for the growth of need-based infrastructure exact information and constant monitoring of traffic by suitable technique is necessary. Organizing authorities must therefore ensure that enough and suitable data is available to recognize necessary planning, design, construction and maintenance of the country's road network, which is aimed at meeting the ideal traffic flow, in coming times traffic growth and loading without significant decline in the standard of service. This instruction has therefore been made with the main aim being to provide basic data, methodology and principles with respect to data collection and survey. There are different techniques of data collection obtained and used by various institutions. This guideline, therefore, is only planned to provide guidance in respect of collected data and survey, and permits for variation in the methodologies acquired by various users, authorities, funding, planners, developers, etc. The recipient of this guideline are Road and highway Department, other Ministries, native authorities, academic institutions.

Motor Vehicle is the main component of the transport system. Motor Vehicle is used for convenience and for time saving motive. Therefore, motor vehicles are enlarging day by day in number because 8 of conveyance social motive also. Our Nashik city in the state of Maharashtra is greatly growing city among the country as well as in the world and it is announced as metro city few years before. The current situation bans the BS-4 engines increased suddenly. And just like in Kumbh-mela sudden increase in traffic in Kumbh-mela time. So, need the handling of traffic and keeping up the safe driving and to resolve the issue of traffic. In India, the signal traffic lights for vehicles commonly have three main lights, a red light that means stop, a green light that means go and yellow that means ready to go. The pedestrians, they have two lights, one is red light and other is green light that mean stop and go respectively. Similarly bringing down the number of accidents, it can make the traffic flow smooth and possibly save time of people.

2. Literature Review

The world's first traffic light came into being before the automobile was in use, and traffic consisted only of pedestrians, buggies, and wagons. Installed at an intersection in London in 1868, it was a revolving lantern with red and green signals. Red meant "stop" and green meant "caution." The lantern, illuminated by gas, was turned by means of a lever at its base so that the appropriate light faced traffic. On January 2, 1869, this crude traffic light exploded, injuring the policeman who was operating it. After the coming of automobiles, the situation got even worse.

Police Officer William L. Potts of Detroit, Michigan, decided to do something about the problem. What he had in mind was figuring out a way to adapt railroad signals for street use. The railroads were already utilizing automatic controls. But railroad traffic travelled along parallel lines. Street traffic travelled at right angles. Potts used red, amber, and green railroad lights and about thirty-seven dollars' worth of wire and electrical controls to 2 make the world's first 4-way three colour traffic light. It was installed in 1920 on the corner of Woodward and Michigan Avenues in Detroit. Within a year, Detroit had installed a total of fifteen of the new automatic lights.

At about the same time, Garrett Morgan of Cleveland, Ohio realized the need to control the flow of traffic. A gifted inventor and reportedly the first African American to own an automobile in Cleveland, Ohio, he invented the electric automatic traffic light. Though it looked more like the semaphore signals you see at train crossings today. Many others had obtained US Patents

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for Traffic Signals, some as early as 1918. But Morgan's Patent was purchased by General Electric Corporation and provided the protection they needed to begin building a monopoly on traffic light manufacture.

Md. Asadullah Khan has described the scenario of traffic jam in Dhaka city in Daily Star with the title "When shall we get rid of Dhaka city traffic jam? published on October 20, 2007 (Khan, 2007). According to him with a huge fleet of cars, buses and all other types of vehicles gridlocked near a rail gate or road intersection sometimes even for 30 minutes at a stretch, Dhaka city's traffic congestion problem has assumed an alarming proportion. People are afraid to get out of their houses because the journey from home to office or business centre takes away the vital hours that he could devote to his work. Other than being late in the offices, work places or on any scheduled appointments, mental disgust, exhaustion and loss of effective man hours is a colossal drain on the resources of the whole country.

Md. Masud Karim (1997) found that limited resources, invested for the development of transport facilities, such as infrastructure and vehicles, coupled with the rapid rise in transport demand, existence of a huge number of non-motorized vehicles on roads, lack of application of adequate and proper traffic management schemes are producing severe transport problems in almost all the urban areas of Bangladesh. Worsening situation of traffic congestion in the streets and sufferings of the inhabitants from vehicle emissions demand extensive research in this field.

According to Nasrin Khandoker and Jonathan Rouse (2004), Congestion in Dhaka has been a growing problem during the last 15 years. In around 1992, the Government of Bangladesh completed a study called 'The Greater Dhaka Metropolitan Area Integrated Transport Study', funded by the United Nations Development Program. The Study recommended an immediate action plan and a long-term strategy to improve transport infrastructure in the Greater Metropolitan area of Dhaka. In response to this, the Government sought assistance from the World Bank to help fund the Dhaka Urban Transport Project (DUTP). Now being implemented, project objectives include addressing urgent policy issues, infrastructure development, capacity building and resettlement of displaced people. Efficient urban management, cost recovery, community participation and involvement of the private sector were identified as the key tools for providing efficient, affordable and sustainable transport (Kazi, 2003).

3. Problem Statement

In Nashik city of Maharashtra state different types of vehicles like bikes, rikshaw, cars, trucks, heavy trucks, bicycles, etc. Nashik city has expanded from a population of 1088000 in 2001 to 16.5 lakhs in 2011. The current population is approximately 1.7 million. Nashik city growth rate is highest as comparing with other so that the daily traffic is increases.

Objectives:

- To control volume of traffic at Mumbai Naka, Nashik Road, Dwarka.
- Planning design and regulation of traffic at Mumbai Naka, Nashik Road, Dwarka.
- Planning and design of new street and flyover at Mumbai Naka, Nashik Road, Dwarka.
- Established properties and schedule for traffic development.
- To develop transportation system.
- To control the local traffic at Mumbai Naka, Nashik Road, Dwarka junction.

A. Scope of the Project

The order to make possible the analysis of current and future traffic demands, for the improvement of required infrastructure correct information and continuous tracking of traffic by suitable methods is required. Executing authorities must therefore checked that enough and correct data is available to do required planning, construction and maintenance of the road network, which is aimed at meeting the persuade traffic flow, growth of traffic in future and loading without considerable declination in the standard of service. The scope of study was restricted to following. There is requirement to conduct analysis on the traffic flow of motor vehicles on the research area to state the number of moving vehicles in a given time. The main purpose involved in preparation of replica of offered smart Transportation System along with a design suitable for the same structure that could be simply executed on station area and could be replicated on other Streets of Mumbai Naka, Nashik Road, Dwarka junction, Nashik city. This guideline has therefore been made with the main purpose being to provide basic data, idea and principles with respect to traffic data collection and analysis. There are different techniques of data collection present and used by various institutions. This guideline is only planned to provide guidance in respect of collected data and survey, and permits for alternative in the strategies acquired by various Planners, Funding Authorities, Users, developers, etc. The recipient of this guideline are Road and highway Department, other Ministries, native authorities, academic institutions.

B. The present system of traffic signal light

The traffic jam is the general issue in most of the cities in the world. The main reason of this issue is casualty. To get the way to increase the traffic flow easily can decrease the numbers of the casualty and can decrease the time of people in road. The ministry has taken out some rules to reduce this issue. Alongside take the penalty and punishment to every traffic offender, the traffic signal lights have been made at the place with higher risk in casualty. However, increasing the numbers traffic signal lights have given some contra problems.

1) Traffic signal light reason of the too much traffic jams

Growing the number of motor vehicles in road, have reason of the too much traffic jams. This occurred usually at the important junctions generally at the morning, before peak hour and at the evening, after the peak hour. The important outcome of this topic increases the wasting of time of people at the road.

2) Emergency vehicle stuck in traffic jam

Generally, during heavy traffic, the emergency vehicles,

such as Hospital ambulance, police and fire brigade will be stuck specially at the traffic signal. This is because the users waiting for the traffic signal light turn to green. This is very serious issue because to save the emergency case become difficult and involving life.

4. Methodology

1. The first step is to study and survey of area location.
2. Referring various research papers and books.
3. Study area profile give current situation of Dwarka junction with respect to study corridor.
4. Point of road selected to apply U-loop traffic design system.

Table 1
Values of Passenger Car Unit Factor for different vehicle categories

Vehicle Types	PCU Factor
Bike	0.56
Rickshaw	0.80
LMV	1.50
Van (passenger)	1.50
Mini Bus	2.00
Standard Bus	3.50
LCV	2.50
2xAxle Rigid Truck	3.50
3xAxle Rigid Truck	3.50
MAV	5.00
Tractor	3.50
Tractor Trailer	4.50
Animal / Hand Drawn Vehicle	4.00
Cycle	0.50

Table 2
The average of 7 day's Traffic Volume Count

Vehicle Types	Dwarka
Two-Wheeler	16113
Auto Rickshaw	11521
Car/ Jeep	16249
Van/Tempo (passenger)	9025
Mini Bus	6045
Standard Bus	9005
2xAxle Rigid Truck	8721
3xAxle Rigid Truck	9525
Tractor	4515

Table 3
Total passenger car unit factor

Vehicle Types	Dwarka
Two-Wheeler	8056.5
Auto Rickshaw	8640
Car/ Jeep	16249
Van / Tempo (passenger)	9025
Mini Bus	9067.5
Standard Bus	27015
2xAxle Rigid Truck	26163
3xAxle Rigid Truck	28575
Tractor	13545
Tractor Trailer	8415
Animal / Hand Drawn Vehicle	3780
Cycle	3260.5
Total Vehicles	161792

Time period	Fast Moving vehicles					Freight vehicles					Slow moving Vehicles	Total Vehicles	Peak hour traffic
	Car / Jeep / Van / Taxi	2-Wheeler	Auto-Rickshaws	Buses	Mini Bus	LCV	Truck (2-Axle)	Truck (3-Axle)	MAV	Agricultural Tractor Trailer			
06 - 07	422	561	244	160	43	161	46	27	27	10	52	1753	2.3%
07 - 08	682	961	385	194	59	197	50	34	28	15	56	2661	3.3%
08 - 09	1161	1727	592	264	61	313	74	58	42	10	54	4356	5.2%
09 - 10	1503	2151	618	351	51	413	98	62	57	9	59	5372	6.4%
10 - 11	1749	2321	691	374	47	432	96	61	51	7	42	5871	6.9%
11 - 12	1704	2389	658	299	58	439	124	68	64	10	44	5857	6.8%
12 - 13	1883	2544	762	287	53	418	97	59	61	9	33	6206	7.1%
13 - 14	1809	2454	761	243	54	437	96	64	45	4	23	5990	6.8%
14 - 15	1838	2499	776	255	50	462	90	51	45	2	39	6107	6.9%
15 - 16	1973	2583	762	301	59	419	94	50	46	7	28	6322	7.2%
16 - 17	1945	2572	764	290	49	444	98	63	48	7	26	6306	7.2%
17 - 18	1976	2521	740	304	48	475	82	49	48	7	33	6283	7.2%
18 - 19	2132	2857	854	298	54	457	92	49	54	13	36	6896	7.8%
19 - 20	2171	2892	903	252	60	489	107	60	49	11	46	7040	8.0%
20 - 21	1826	2431	689	162	60	258	61	56	38	11	43	5635	6.2%
21 - 22	1360	1600	531	167	52	215	63	42	39	16	50	4135	4.7%
Total Vehicles	26134	35063	10730	4201	858	6029	1368	853	742	148	664	86790	100.0%
Modal Split	30.11%	40.40%	12.36%	4.85%	1.00%	6.94%	1.57%	0.98%	0.85%	0.17%	0.77%	100.0%	

Fig. 1.

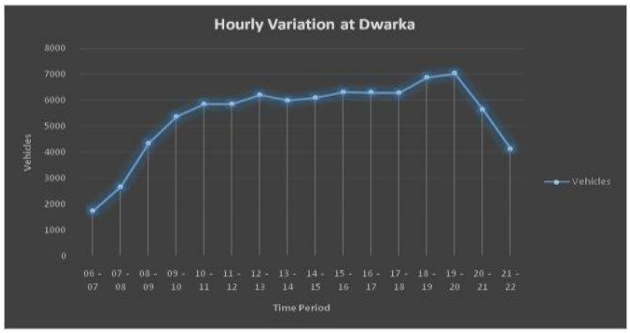

Fig. 2. Hourly variation at Dwarka

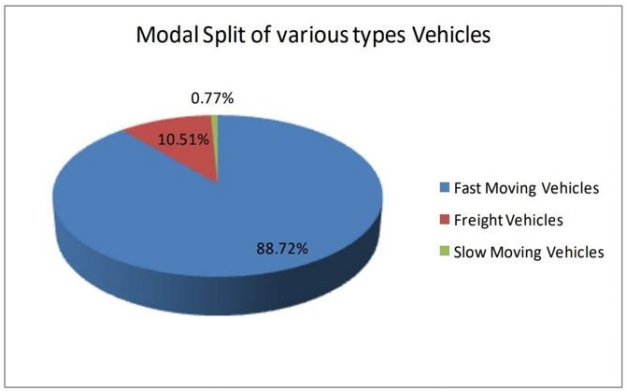

Fig. 3. Modal spilt of various types of vehicles

Fig. 4. Ambulance stuck in traffic at Dwarka circle

Fig. 5. Hectic work for traffic police even in the presence of traffic signal

Fig. 6. Visited the site and asked officials about their views

5. Conclusion

This paper presented a development of a U-loop traffic sensor device that can detect the vehicles under miscellaneous and without lane traffic conditions.

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