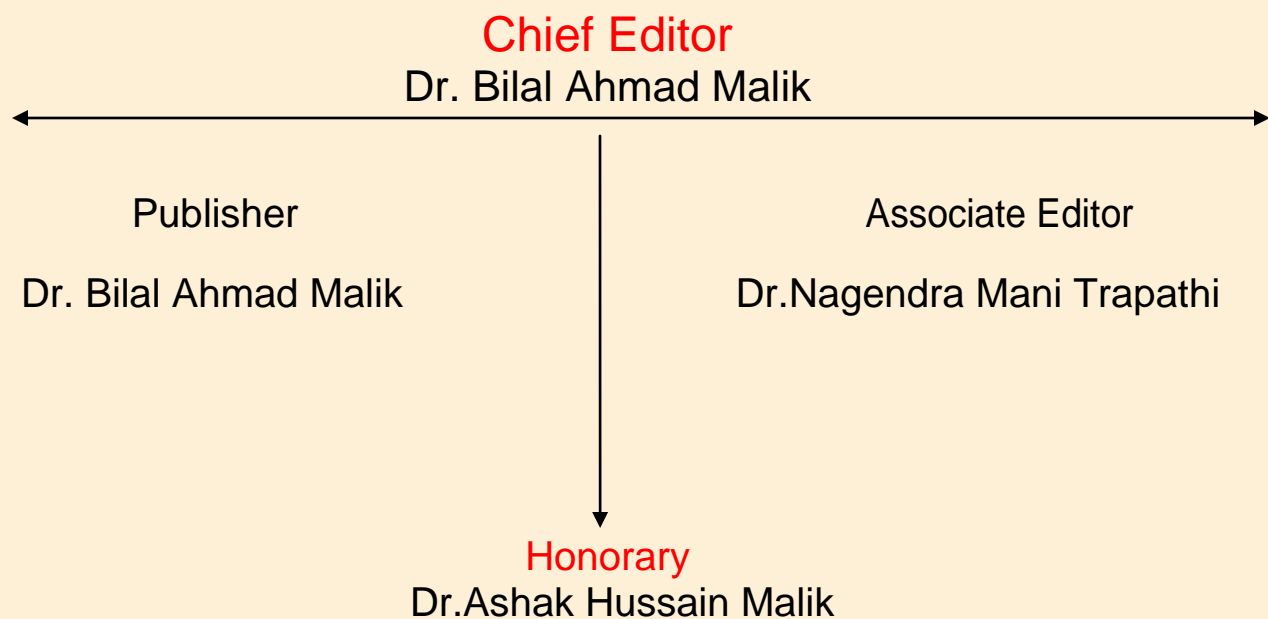# North Asian International Research Journal Consortium

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Editorial Board

"TRAFFIC CONTROLLING BARRICADES"

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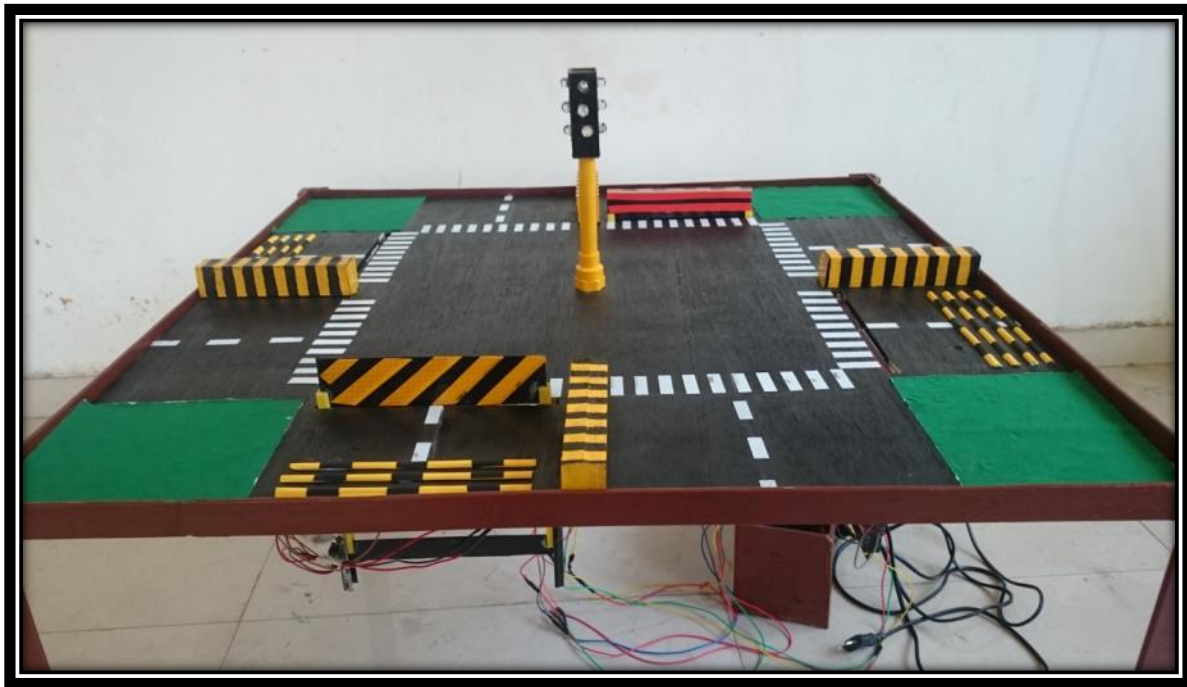
ABSTRACT

In India the rate of road accidents is increasing day by day. Most of the time these accidents occur at four ways. The time that is set on the signals are not been properly followed and therefore ends up into severe accidents. Our project aims avoiding these accidents at the four ways.

People often violate the traffic signals and fall victim of accidents. Therefore instead placing only signals if there are barricades placed at four ways the accidents can be avoided. There are eight lanes in a four way; therefore there will be four barricades which will be timed. These timed barricades by turns will open one at a time which will release the vehicles on that lane. Therefore the vehicles from any of the either lanes will not try to cross the road thereby avoiding any mishappening.

INTRODUCTION

Number of vehicles on road is increasing day by day. According to news of one of the newspapers (Sakaal), during the year 2010, the number of vehicles coming on road is nearly 626 per day. This number being very high the chances of traffic jams and accidents are also increased. It is therefore necessary to keep a check on this increasing number of vehicles. People that do not follow the traffic rules create a mess on four ways and other roads. Thus an effective system must be implemented on roads to avoid accidents and traffic jams.

There is a survey done in India by Indian Road Survey & Pvt. Ltd every year related to the accidents taking place on road. Those are classified as Drink and drive, Failure to drive safely, Centre line crossing, Speeding, Disobedience of Signals, Failure to maintain safe distance and others.

Such surveys help in knowing the present conditions of traffic in India. It also helps us in planning the schedules for traffic dispersion or plan the solutions to avoid these traffic jams and accidents.

For our project we surveyed some of the four ways from 19/6/2015 to 24/6/2015 at our residence with the results as below.

1) Appa Balwant Chowk – 27 Accidents, 12 Casualties
2) Gadital (Hadapsar) - 16 Accidents , 21 Casualties
3) Sasane Nagar (Hadapsar) - 11 Accidents , 17 Casualties
4) Wadia College Chowk - 32 Accidents , 18 Casualties

In city there are number of four ways which are accident prone areas. We therefore got the problem definition. Working further on this problem we came with a conclusion that these accidents are cause of the mentality of the people in India especially in Pune.

LITERATURE SURVEY

1) Traffic Signal Control Systems:

An Advanced Traffic Signal Control System that updates traffic signal timing in some automated way.

2) The SCOOT Urban Traffic Control System:

By detecting the number of vehicles on a road it controls the time span of the signals.

3) PLC Based Intelligent Traffic Control System:

The system developed is able to sense the presence or absence of vehicles within certain range by setting the appropriate duration for the traffic signals to react accordingly.

4) Intelligent Transportation System:

This is the combination of SCOOT and Adaptive traffic control system

PROBLEM STATEMENT & OBJECTIVE

Transportation has grown over these days. This has also raised the number of vehicles on road. Therefore these increasing numbers of vehicles is also increasing the rate of accidents and thereby the deaths.

We came up with an idea to nearly avoid the traffic jams and accidents by using a simple concept of barricades. In India, four ways (chowk) are more accidents prone areas. When there are 4 to 5 seconds left for a lane to leave people try to cross the lane breaking the signals and lane. When these people cross the road breaking the signals and lane they fall victim of accidents and traffic jams occurring at four ways (chowk) due to Indian mentality.

Problem Statement: To Design, program and manufacture a prototype to minimize traffic jams and accidents at four ways occurring due to mentality of citizens in India.

Therefore, our **objectives** are to:

1. Reduce the traffic jams on four ways.
2. Avoid accidents on four ways.
3. Change the mentality of citizens to follow the traffic rules.
4. Provide safe road crossing for pedestrians.
5. To help the city to became smart.
6. To reduce the traffic stress on cops.
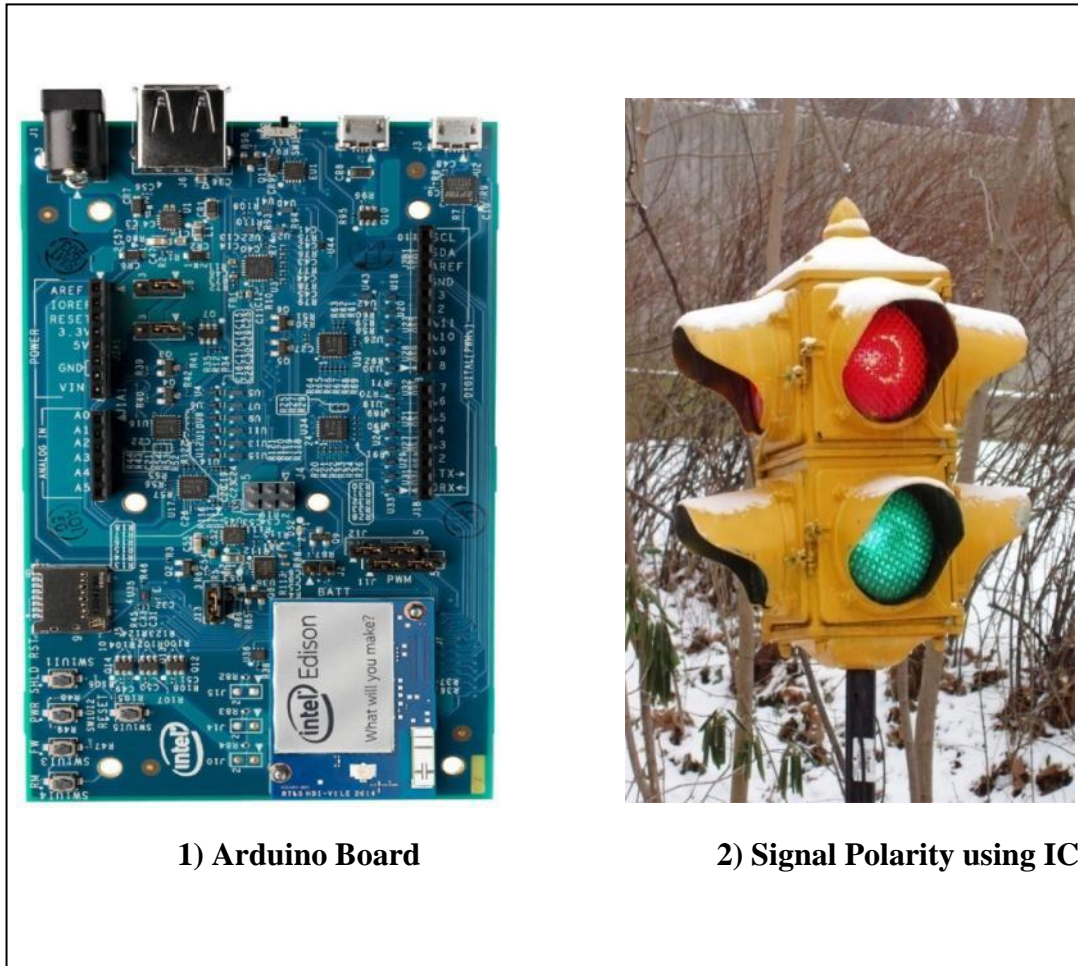
BARRICADE

Need of Barricades:

Roadside hazards may be assessed for the danger thy posse to travelling motorists based on size, shape and rigidity and distance from the edge of travel way. For instance, small roadside signs and some large signs often do not merit roadside protection as the barrier itself may pose a greater threat to general health and well-being of the public than the obstacle it intends to protect. In many regions of the world, the concept of clear zone is taken into account when examining the distance of an obstacle or hazard from the edge of travel way.

Barricade, from the French barrique (barel), is any object or structure that creates a barrier or obstacle to control, block passage or force the flow of traffic in the desired direction. Barricades also include temporary traffic barricades with the goal dissuading passage into a protected or hazardous area of large slabs of cement whose goal is to actively prevent forcible passage by a vehicle. Strips on barricades and panel devices slope downward in the direction traffic must travel.

DRIVES FOR BARRICADES

For the barricades in our model we have two sources to give the drive to the barricades.
These drives will play an important to operate the barricades.

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| 1) Arduino Board | 2) Signal Polarity using IC |

(Courtesy: *)*

Photograph No.: 2 Drives for Barricades

Arduino Board:

Arduino board is the hardware in which we can feed a program which we have to execute in a sequential manner. It has different ports like power pins, output pins, input pins, USB port etc. Through USB port we can feed the program which is stored in memory of the Arduino board. Through input pins we can give the inputs through the program and get the outputs through the output pin. Even though this method is very easy to automate the barricades the problem is that the costing of the actual setup goes very high. That's why we search the alternate method to this and we come up with the decade counter IC and the polarity of the motor which is described in the next topic.
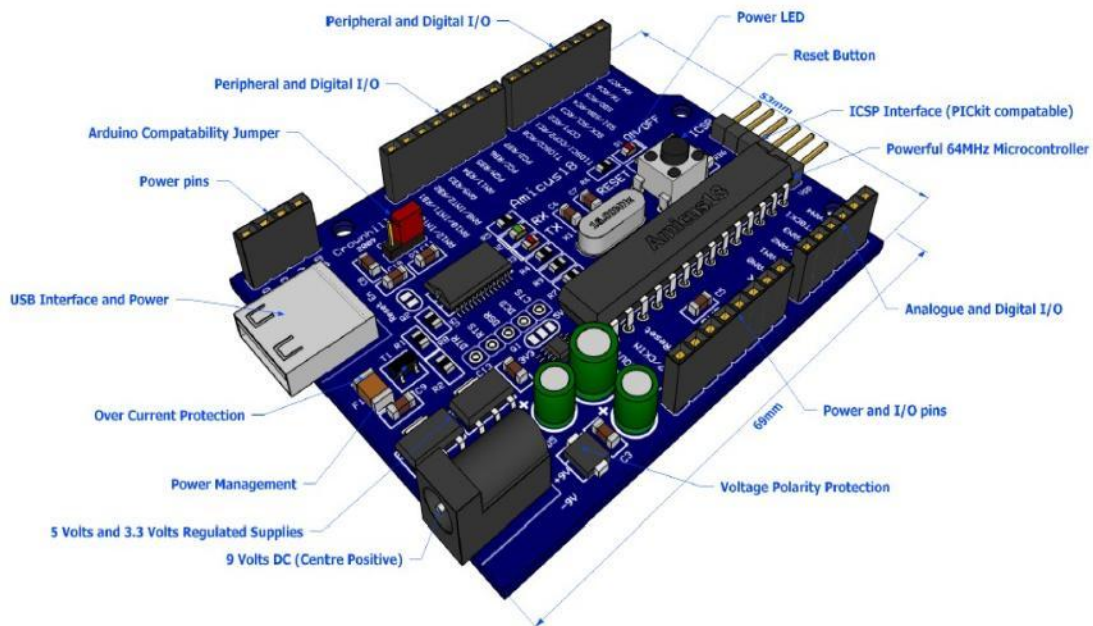
(Courtesy: ARDUINO *)*

Fig. No.1: Nomenclature of Arduino board

IC & Motor Polarity:

As we have to reduce the costing we search and select the alternative method to the Arduino board which is using some decade counter, pulse generator ICs and changing the polarity of motor using some relays. We made a circuit in such a manner that we can control the timing of the signal & with respect to it we can also control the drive of motors which are used to raise and lower the barricades placed before the zebra crossing.

As we are going to give certain height to the barricade, after raising barricade we need to stop the barricade alternately we need to stop the motor. So we use limit switches to stop the motor after raising and lowering the barricade.

We made a circuit in such a way that the opposite lanes of four way are allowed to pass it and other opposite lanes are stopped. Consider the east-west lanes are allowed to pass the four way by giving the green signal and at the same time the north-south lanes are stopped by giving red signal. Similarly after some time east-west lane is

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stopped and north-south lanes are allowed to pass the four way. Due to this time is saved by operating the system in the above manner. As it takes more time to allow single lane to pass the four way.

Barricade starts raising when red signal glows before it for indication of barricade is raising yellow signal is glows. When the barricade is raising there is chance of dashing the vehicle to the barricade. For this reason we place some rubber humps before the barricade in such a manner when the barricade is raising the vehicle may not dash to it.

C –CHANNEL

To raise and lower the racks some arrangement were supposed to be made for its proper working without any misguiding of the racks. Therefore guide ways were the option to guide the racks.

1) Aluminum	3) Wood
2) Foam	4) Acrylic
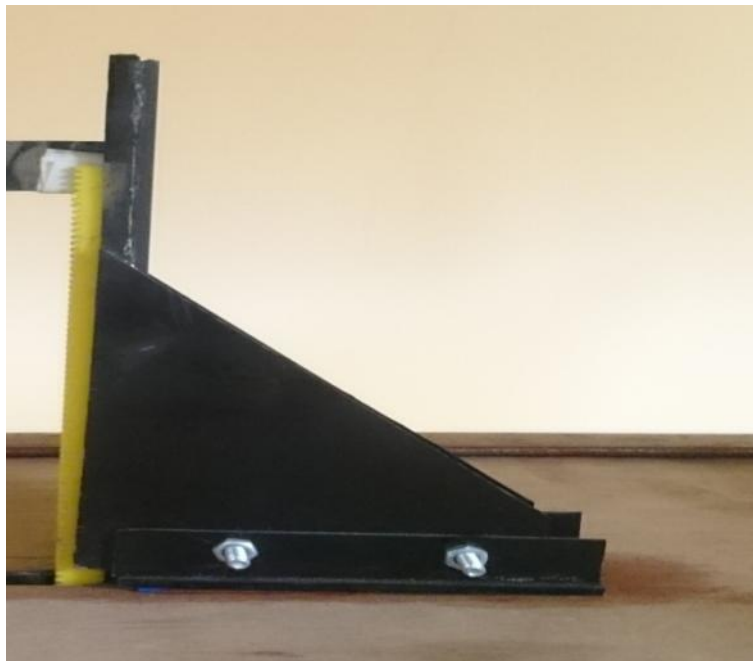
Photograph No.3: Acrylic C-Channel

After testing the C Channel of acrylic, it was decided to use the acrylic sheet for C channels.

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INTEGRATED CIRCUIT

CD4017BC:

Decade counter/ Divider with 10 Decoded outputs, divide by 8 counter/ Divider with 8 Decoded output.

General Description:

The CD4017BC is a 5 stage divide by 10 Johnson counters with 10 decoded outputs and a carryout bit. This counter is cleared to their 0 count by a logical 1 on their reset line. The IC 4017 is a versatile IC of the CMOS family which has got wide range of applications. Internally it consists of a 10 stage decade counter/divider. When a clock pulse is applied to it externally, its outputs become logic 'high' and 'low' sequentially (one after the other). It has got numerous applications, for example in circuits where sequential switching are required and also in decorative ornamental lighting, where the lights are switched on and off sequentially giving it a 'running' effect.
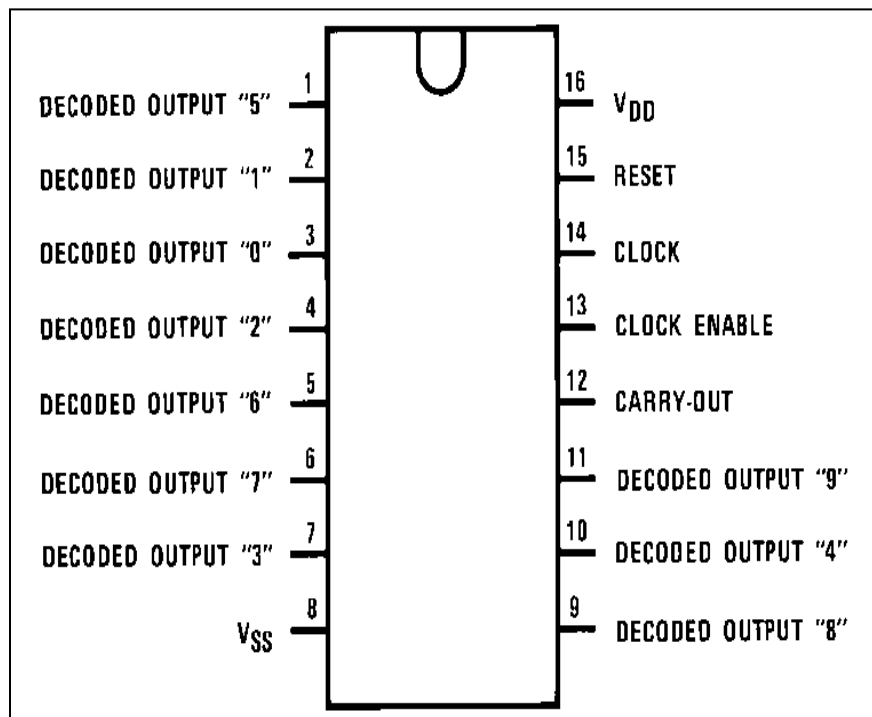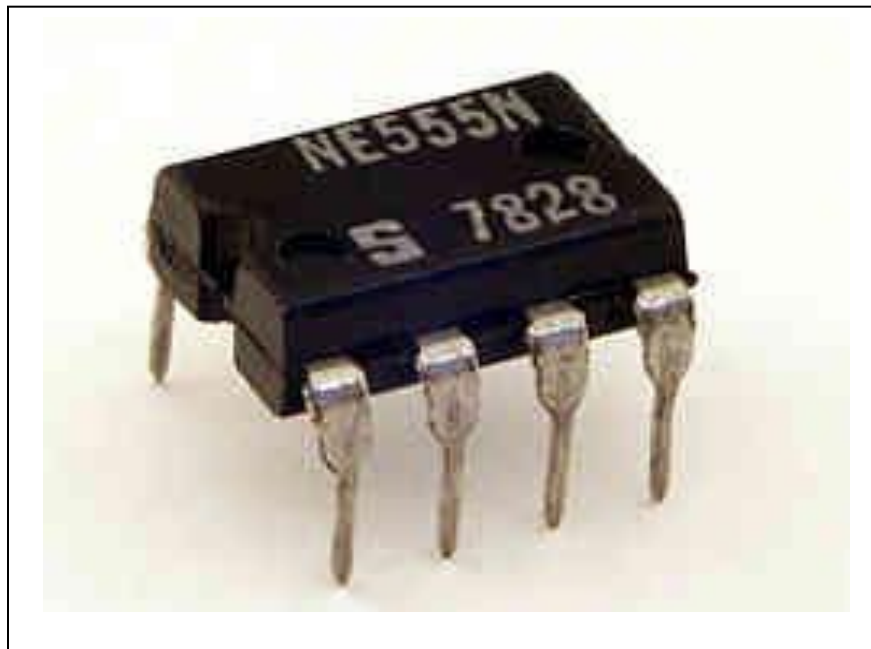
Pin Configuration of IC 4017 Decade Counter:

Fig. No. 2: IC 4017 Pin Out

Timer IC 555:

The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. Derivatives provide up to four timing circuits in one package. Introduced in 1971 by American company Signetics, the 555 is still in widespread use due to its low price, ease of use, and stability. It is now made by many companies in the original bipolar and also in low-power CMOS types. As of 2003, it was estimated that 1 billion units are manufactured every year.

(Courtesy: wikipedia.com)

Photograph No.4: IC 555

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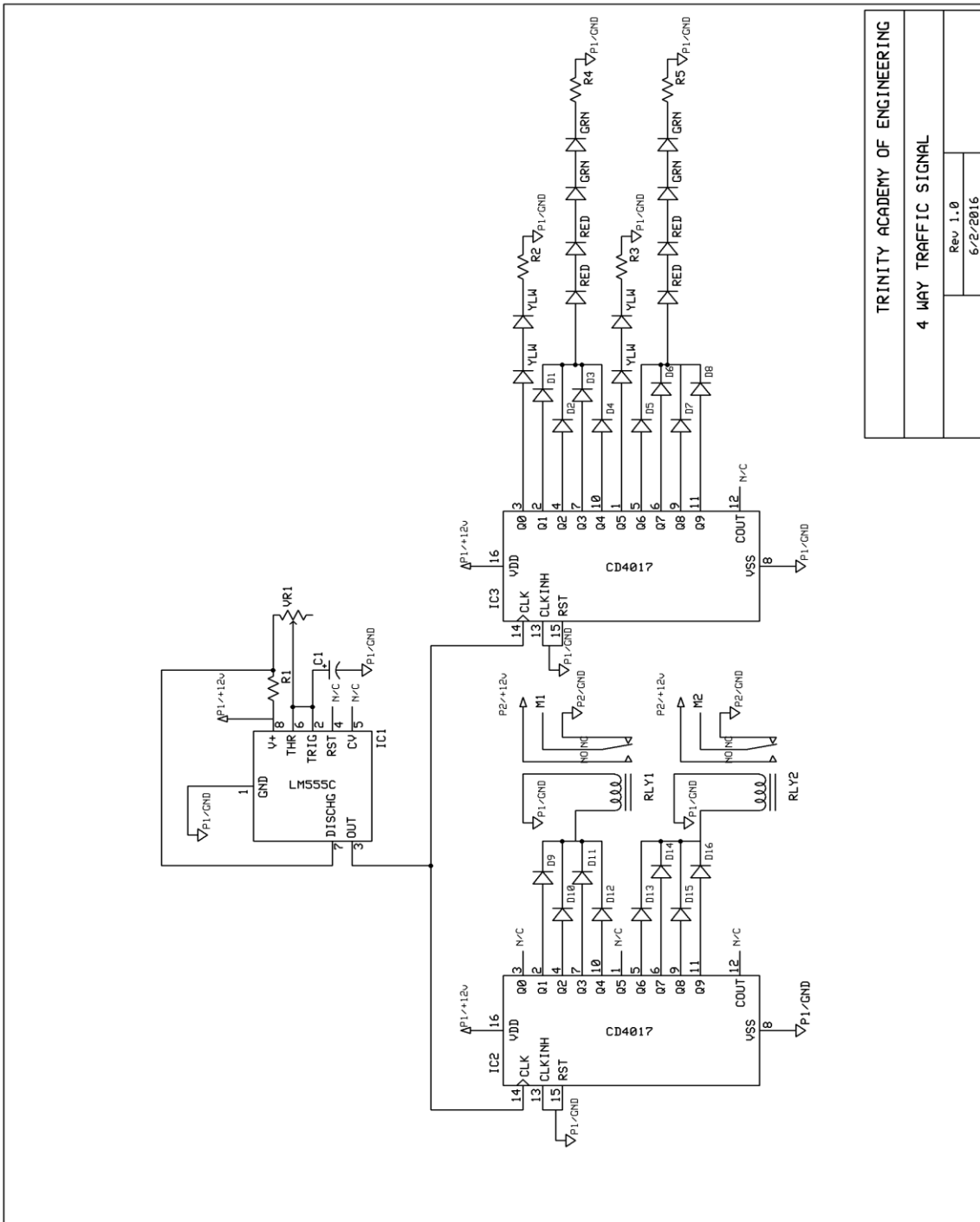
Four Way Traffic Signal Circuit:

Fig. No.3: Four Way Traffic Signal Circuit

DESCRIPTION:

The 555 IC generates the pulse which is needed for time counting which is done by CD 4017 IC (Decade Counter). IC 4017 i.e. the decade counter counts the pulses generated by IC 555 from 1 to 10. The frequency of pulses is regulated by the potentiometer VR1 that are received by CD 4017 IC.

Both ICs IC 2 and IC 3 and both decade counter receives the same pulse so they work in synchronization. Each of these output are decade counter accept output 1 and output 5 (Q1 and Q5) are connected to 4148 diodes which restricts the reversal of any voltage.

The diodes are grouped in a group of four. As per the output the output numbers the first four of IC 2 are given to the coil of the relay 1 and those of IC 3 are given to two red and two green LEDs. Similarly the other group of four diodes is connected to coil of relay 2 and the other set of red and green LEDs from IC 2 and IC 3 respectively.

Now, the output 0 and output 5 (i.e. Q0 and Q5) of IC 3 is connected to 1 pair of yellow LED each and all these LEDs are connected to ground via resistors R2, R3, R4 and R5 respectively. As both the circuits are synchronized the barricades will raise and lower in co-ordinations with the signals. When the two opposite red signals are glowing, the remaining two opposite green signals will glow at the same time. Now, when the red signals are glowing, the barricades of that lane will rise up keeping the barricades of the lane that is glowing the green signals lowered down. The same operation will be carried out with the remaining lanes.

Power Supply to the Circuit

The whole circuit is supplied by 12V DC power supply P1 of 2Amp and the motors are supplied via power supply P2 of 12V DC, 1Amp.

Rubber Hump

It would not work just placing the barricades at the four ways. Vehicles coming with speed may strike the barricades. Therefore it is necessary to lower down the speed of vehicles. To reduce the vehicle speed there should some arrangement made on the lane. One of the ways to reduce the vehicle speed is using rubber humps.

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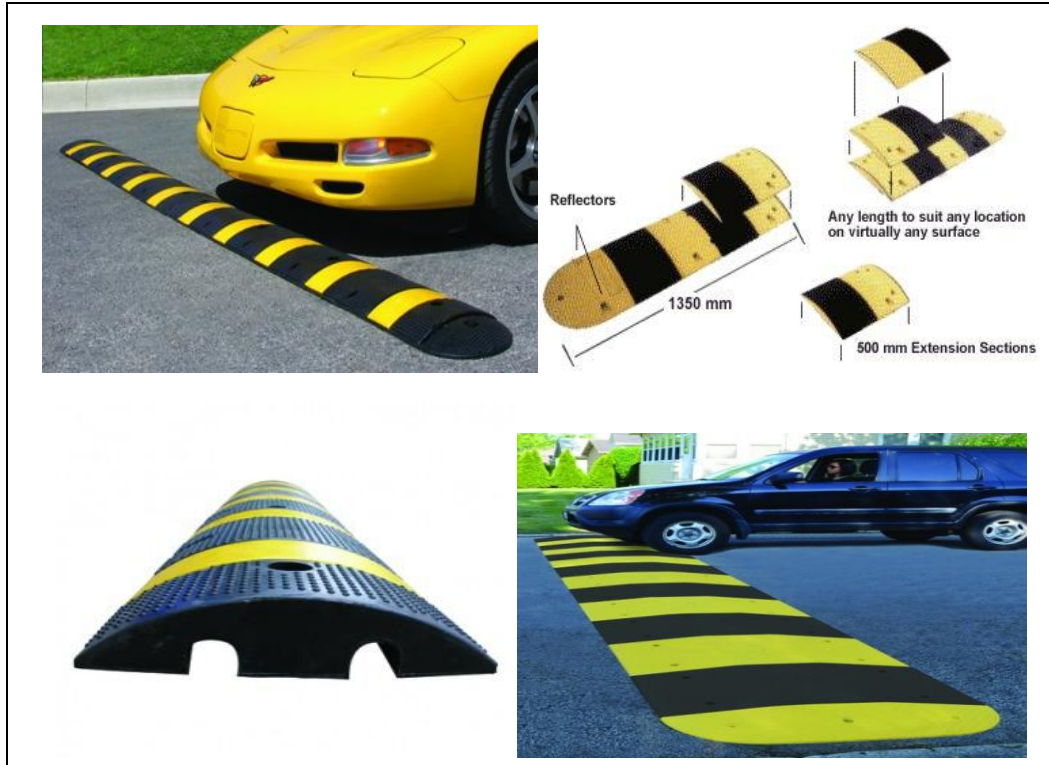
Rubber Hump:

(Courtesy: Unnathi Suppliers)

Photograph No.5: Rubber Hump

A rubber hump is a small speed breaker made of rubber. As like speed breakers of tar this humps are also used to reduce the speed. But they can be placed in multiple numbers to reduce the speed even more.

ADVANTAGES & LIMITATIONS

 Advantages:

1) People will follow traffic rules at the four ways.

2) Work load on the traffic police will reduce which thereby improve their interest in   work.

3) There will be no traffic jams.

4) This technique may be helpful in making the city smart.

5) The time and expenditure for clearing the road after accidents will be saved.

6) Operation of the system is easy.

7) Easy installation and low maintenance.

Limitations:

1) The humps may create noise.

2) People will be annoyed due to slowing down the vehicles.

3) Periodic lubrication will be needed since there are moving parts.

FUTURE SCOPE

1) By using the vehicle detecting sensors we can control the raising and lowering time of barricades with respect to signal similar to SCOOT system.

2) We place labels on important vehicles like fire brigades, ambulances or school buses etc. which will sensed by the sensors so that the barricade lower down to let these vehicles pass by giving them first reference.

3) All the signals in the city can be interconnected to each other for ease in traffic controlling.

4) If at all there is adverse condition of the traffic the system can loaded with voice recognition technique so that the traffic officer can control the barricades by his voice.

5) Instead of fixing humps, we can place sensors that would create a magnetic field and slow down the vehicle automatically.

CONCLUSION

It was necessary to keep a check on the increasing rate if accidents and traffic jams. Therefore we found a solution to reduce the traffic on four ways. The timely operated barricades will keep on working and help in make the people follow the traffic rules.

No such solution was available to make people follow the traffic rules to save their lives or fatal injuries. We have built an effective method to avoid the accidents on four ways is created.

Mentality of people was a severe problem to be tackled. These barricades will make people stop at red signals by hook and crook. Thus, mentality of citizens will also be changed making them follow the traffic rules.

It is said that pedestrians are the lions of the roads. But people halting their vehicles on the zebra crossing or even ahead of that would create the pedestrians problem in crossing the road. It was unsafe to cross the road for them. Our concept would assure safety to the pedestrians in crossing the roads.

Now-a-days the idea of making the smart city is in a boom. The concept of Automatic Traffic Controlling Barricades will make the smart city.

REFERENCES

Journals:

1) "The SCOOT Urban Traffic Control System",Mazzamatti, M.V., D.V.V.F. Netto, L.M. Vilanova and S.H. Ming. 1998. Benefits gained by responsive and adaptive systems in São Paolo. Paper presented at the IEE Road Transport Information and Control, Conference Publication No. 454.

2) "Adaptive Traffic Control System in US", Matt Selinger & Luke Schmidt.

3) "PLC Based Intelligent Traffic Control System", Muhammad Arshad Khattak. Department of Computer Science and Information Technology Sarhad University of Science and Information Technology (SUIT) Peshawar 25000 Pakistan.

4) "Intelligent Transportation System for Traffic Control System" U.S. Department of Transportation, Oak Ridge National Laboratory, "Temporary Losses of Highway Capacity and Impacts on Performance: Phase 2," Oakridge National Laboratory Report No. ORNL/TM-2004/209, Oak Ridge, TN: November 2004.

5) "Traffic Signal Control Systems" An Evaluation of Real-Time Traffic Adaptive Control Prototypes, 1997, Submitted to TRB by Larry E. Owen, Charlie M. Stallard and Deborah M. Glitz.

Internet:

1) http://www.scoot-utc.com/WhatIsSCOOT.php?menu=Overview.

2) https://www.google.co.in/search?q=traffic+light+control+system&biw=1366&bih=567&tbm=isch&tbo=u&source=univ&sa=X&ved=0CCcQsARqFQoTCIDkrZWvjMgCFYbcpgodtP4IZg#imgrc=_

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