

Government Science College, Vankal

Department of Physics

A Project Report entitled

“Road Accident Prevention System”

Submitted

By

Naik Chetanbhai Maneshbhai,

Vasava Motising Mansing

&

Vasava Vineshbhai Manubhai

Students of

T. Y. B.Sc.

Semester VI



Under the supervision of

Dr. H. P. Vankar

Assistant Professor & Head

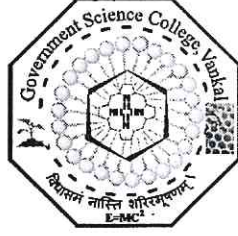
Department of Physics,

Government Science College, Vankal-394 430,

Gujarat, India

March, 2023

Government Science College, Vankal



Certificate

This is to certify that the work incorporated in the project entitled “**Road Accident Prevention System**” submitted by the following students

Sr. No	Name	Roll No.	Uni. Exam No.
1.	Naik Chetanbhai Maneshbhai	208	4842
2.	Vasava Motising Mansing	209	4843
3.	Vasava Vineshbhai Manubhai	210	4844

was carried out under my supervision/guidance during the academic year 2022-2023. The work done by the students is a part of their project work for Semester VI in T. Y. B.Sc. and is found satisfactory.

H.P.V.
16/03/23
Dr. H. P. Vankar
(Supervisor)

Assistant Professor & Head,
Department of Physics,
Government Science College,
Vankal-394 430,
India

Head
Physics Department
Govt. Science College, Vankal
Ta. Mangrol, Dist. Surat.



Examiner

Chunay
24/3/2023

Declaration

We declare that the project entitled “**Road Accident Prevention System**” submitted by us in T. Y. B.Sc. is the record of work carried out during the semester VI under the guidance of **Dr. Hemal P. Vankar**. We further declare that the material obtained from other sources has been duly acknowledged in the report. We shall be solely responsible for any irregularities, if noticed in the report.

Date: 15th, March 2023

Place: Vankal

1. Naik Chetanbhai Maneshbhai



2. Vasava Motising Mansing



3. Vasava Vineshbhai Manubhai



Students

T. Y. B.Sc.

Department of Physics,

Government Science College,

Vankal-394 430.

ACKNOWLEDGEMENT

This project report has been kept on track and seen through to completion with the support and encouragement of numerous people including my mentors, well-wishers, friends, colleagues. It is a pleasant opportunity to express my heartfelt thanks to all those people who made this project possible and contributed in different ways.

First and foremost, I would like to give my sincere gratitude to most respectable supervisor **Dr. H. P. Vankar**, Assistant Professor and Head of the Department of Physics, Government Science College, Vankal for his patience, immense knowledge, encouragement and constant support. His guidance has helped us throughout our project work and in writing our report.

We would like to express our sincere thanks to **Dr. P. K. Chaudhari**, Principal, Government Science College, Vankal for his suggestions, constant encouragement, and providing experimental lab facility for project work.

We would also like to convey our gratitude to **all faculty members of Department of Physics**, Government Science College, Vankal, **Dr. K. S. Patel**, **Miss A. B. Chaudhari**, **Ms. Priyanka S. Gamit** and **Ms. Drashti Patel**, and lab technician, **Mr. Savanbhai** for their intimate cooperation through the period of project completion, spending their crucial time and helping us immensely with our project.

We are grateful to the **Coordinator and Co-coordinator of the Innovation Club**, Government Science College, Vankal, for providing most of the electronic components, which were used to make the project.

We would also like to acknowledge our group members as without them it would have been impossible to complete this project. And lastly, we would like to conclude our deepest gratitude to our parents as our full dedication to this project would not have been possible without their blessings and moral support.

TABLE OF CONTENTS

Sr. No.	CONTENTS	PAGE NO.
1	Introduction	6
2	Project details	6
2.1	Circuit diagram	6
2.2	Components used in the circuit	7
2.3	Working of the project	7
3	Components Description	8
3.1	LDR	8
3.2	BC-547 Transistor (NPN)	8
3.3	Resistor	9
3.4	LED	9
3.5	Battery	10
3.6	Buzzer	10
3.7	PCB	11
4	Conclusions	11
4.1	Cost analysis of the project	11
4.2	Advantage	12
4.3	Application	12
5	Future work	12
	References	13

1. INTRODUCTION

There are many dangerous roads in the world like mountain roads, narrow curve roads, T roads. In these some mountain roads will be very narrow and they contain so many curves. For example Kinnaur road in Himachal Pradesh, Zojila Pass in the Himalayas, the Road of Death Bolivia, Fairy Meadows Road (Pakistan).

1. If the road is in remote areas sometimes there will be the chances of animals on the road and that is also dangerous if the driver couldn't see them. For example Pitt Enterprises Ltd. V. Farkes. 2005 BCCA 511 the defendant collided with a moose standing in his lane and that caused his vehicle to move into the oncoming lane and strike the plaintiff's vehicle.

2. In some of the curve roads, the other end of the curve road cannot be seen by the driver because of the obstacles like trees or rocks etc present in the middle. In these type of roads thousands of people die because careless or presence of unexpected obstacles. According to Million Death Study (MDS) about 2.3 million people die in India per year. In that 137 thousand is because of road accidents. That is about 377 people per day. In that 3.7 % because of failed to look the road.

3. The problem in these curve roads is drivers can't able to see the vehicle or obstacles coming from other end of the curve. If the vehicle is in very speed then it is difficult to control and there are chances of falling to cliff. The solution for this problem is alerting the driver about the obstacle or vehicle. Usually horn is used for this purpose. But in the rainy seasons horn will not be heard. Some people will not use horn itself. So horn is not a good solution to solve this problem. These are the major reasons for accidents.

4. To avoid these problems in curve roads or T roads we are introducing sensor based accident prevention system. That is we are keeping ultrasonic sensor in one side of the road before the curve and keeping a LED light after the curve [5]. Ultrasonic sensor which is also called as obstacle sensors sends signal as pulse from trigger. If vehicle is present signal will hit the vehicle and it is received by the sensor.

2. PROJECT DETAILS

2.1. CIRCUIT DIAGRAM

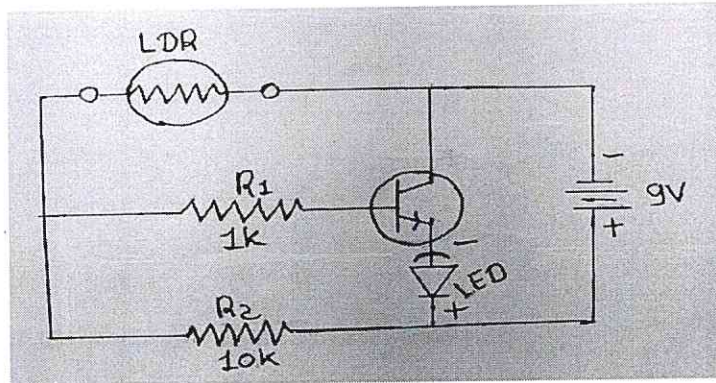


Fig. 1 Circuit diagram of road accident prevention system. [1]

2.2. COMPONENTS USED IN THE CIRCUIT

Table 1 List of components used in the circuit

Components	Specification	Quantity
1) BC547 Transistor	–	2
2) Resistance	1) 10k Ohm 2) 1k Ohm	2 2
3) LDR	–	2
4) LED	3 volt	2
5) Battery	9 volt	2
6) Buzzer	–	2

2.3. WORKING OF THE PROJECT.

- LDR, bc547 transistor, resistance, LED and buzzer have been used in this project.
- In the project the circuit is arranged in such a way that LDR can be used as a sensor.
- In this circuit, a laser light is arranged on the LDR so that if a vehicle, a person or an animal comes between the LDR and the laser light, it will act as a sensor.
- This project is used to prevent accidents on curvy roads or hilly roads.
- Two such circuits have been used in the project.

→ Out of which one circuit is arranged on the left side of the road and the other circuit is arranged on the right side of the road.

→ When a vehicle, person or animal comes between the LDR and laser light arranged on the right side, the buzzer will sound on the left side and the red light will be illuminated. So the person coming from the left side will know that a car or someone is coming from the front. And he will reduce the speed of his car.

→ A similar process will happen on the right side as well.

→ So the chances of an accident will be reduced.

3 COMPONENTS DESCRIPTION

3.1 LDR

A light dependent resistor (LDR) also called a photo resistor or a cadmium sulfide (Cads) cell. It is also called a photoconductor. it is basically a photocell that work on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light decreases. This optoelectronic device is mostly used in light varying sensor circuit, and light and dark activated switching circuits. Some of its application includes. Camera radios, light beam alarms, reflective smoke alarms and outdoor clocks.



Fig. 2 LDR

3.2. Transistor BC-547 (NPN)

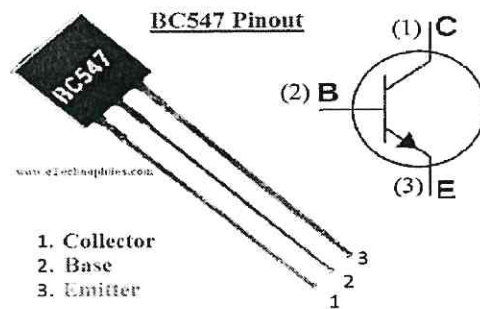


Fig. 3 BC-547 Transistor (NPN)

The BC547 transistor is an NPN transistor. A transistor is nothing but the transfer of resistance which is used for amplifying the current. A small current of the base terminal of this transistor will control the large current of emitter and base terminals. The main function of this transistor is to amplify as well as switching purposes. The maximum gain current of this transistor is 800A.

3.3. Resistor (10k ohm, 1k ohm)

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators.

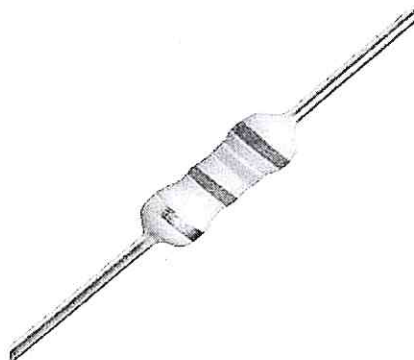


Fig. 4 Resistor

3.4. LED (Light Emitting Diode):

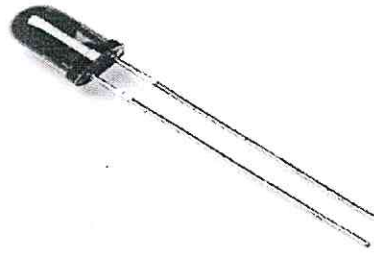


Fig. 5 LED

A light - emitting diode is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.

3.5 Battery

A battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying power, its positive terminal is the cathode and its negative terminal is the anode.



Fig. 6 9 V Battery

3.6 Buzzer

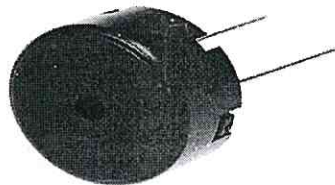


Fig. 7 Buzzer

A buzzer or beeper is an audio signaling device,[1] which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.

3.7. PCB

A printed circuit board (PCB) is a laminated sandwich structure of conductive and insulating layers. PCBs have two complementary functions. The first is to affix electronic components in designated locations on the outer layers by means of soldering.

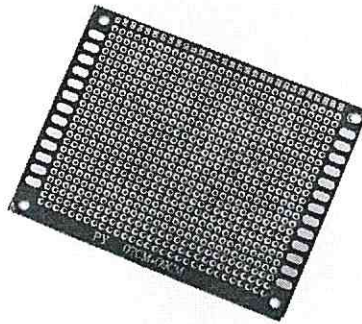


Fig. 8 PCB

4. CONCLUSIONS

4.1. COST ANALYSIS OF THE PROJECTS

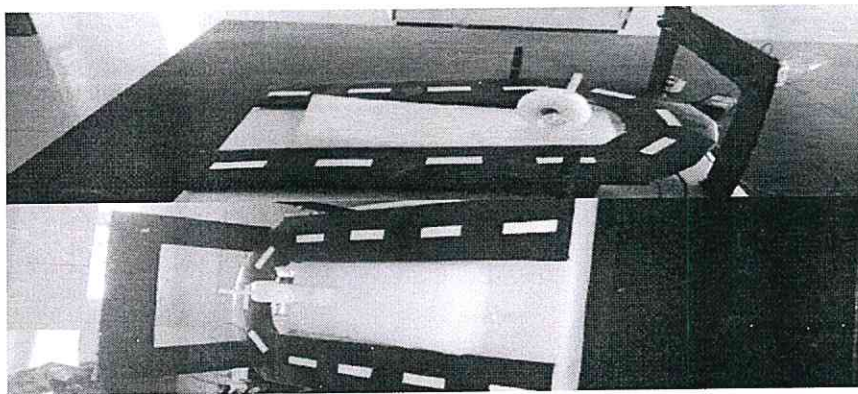


Fig. 9 Image of the working project: Road Accident Prevention System. [2]

Road accident prevention system is useful to avoid road accidents. road accident prevention system shows excellent performance with world technology with minimum cost. It is cheap and durable.

Table 2 List of components and its cost.

Components	Quantity	Cost in Rs.
1). BC547 Transistor	2	24
2). Resistance	2	20
3). LDR	2	20
4). LED	2	10
5). Battery	2	40
6). Buzzer	2	40
Total cost in Rs.	–	154

4.2. ADVANTAGE

- 1). Avoid accidents in curve roads mountains roads and hill roads.
- 2). Saves thousands of lives.
- 3). Easily implementable to the existing roads.
- 4). Fully automated (No person is required to operate)
- 5). Installation cost is very less.
- 6). Vehicle monitoring systems can be implemented easily.

4.3. APPLICATIONS

Road accident prevention system plays an important role in ensuring and sustaining human life. In modern life, vehicles are used to transport goods and travel around. And so accidents are seen to happen more in today's time. Road accident prevention system should be used to prevent it. The road accident prevention system is mostly used to prevent accidents on hilly roads and winding roads.

5 FUTURE WORK

- 1). Arrangements to protect the sensor from being damaged in critical places.
- 2). Decrease the size of unit so that it occupies small place and easily kept in narrow roads.
- 3). Implementing the system to detect number of vehicles and velocity of vehicle.

REFERENCES

[1] <https://youtu.be/pxoLqhCiWT4>

[2] <https://youtube.com/watch?v=n9yyHMwiPJM&si=EnSikaIECMiOmarE>