

Road Safety At Dive Ghat & Electricity Generation Using Advanced Techniques

Prof Rahul Udata¹, Kaushik Sanjay Vaidya², Pradip Subhash Yadav³, Sachin Digambarrao Naik⁴,
Rushikesh Nandulal Mahajan⁵

¹Assistant Professor Dept of Civil Engineering

^{2, 3, 4, 5}Dept of Civil Engineering

^{1, 2, 3, 4, 5}Dhole Patil college Of Engineering, Wagholi, Pune, India

Abstract- “Speed Kills”, but still people don’t care enough to act safe while driving on road. Road traffic accidents and deaths caused by them are most critical issues now days which is also impacting adversely on the country’s economy. Research in this paper includes important issues like road accident, their impacts, and causes of these accidents, effects of accidents, prevention and control measures that can improve this situation.

Now a day, while driving through the ghat section during long journey, percentage of accident in ghat area is increasing at an alarming rate, and the severity of these accidents is non-reparable. Due to unavailability of street lights in ghats especially while turning, it becomes more difficult to make turn. Vehicles coming from another side of road are not visible due to obstructions and darkness. In this paper we are trying to put a valid effort to reduce the rate of accidents causing death due to lack of signal system and proper safety guidelines in ghat section. We are suggesting to use smart signal system fabricated by us which can be replaced by traditional speed breaking system. Our smart signal system is capable of both reducing the speed of vehicles and producing the electricity simultaneously. The system includes rollers, generator, IR sensors and LEDs. The working of the system is as the vehicles moving in both lanes come in contact with rollers which are fixed to a steel ramp, vehicle passes over it will start moving a pulley drive mechanism provided which will transfer the motion to a DC motor/generator for electricity generation. This method provides an efficient way to generate electricity from the kinetic energy of moving vehicles on roads, highways, parking lots etc. The cost of fabrication of the model is less which provides a boost in application of this system at above mention sites.

I. INTRODUCTION

Mostly, in the hilly areas of Dive Ghat, Pune-Pandharpur highway, Maharashtra accidents occurs due to poor development of likely national highways and hazard zones. In India the rate of accidents in ghat section is

increasing day by day. To reduce the rate of the accidents in this zone we have to suggested the provision of road safety management system which includes the study of

- i. Traffic survey
- ii. Engineering Measures
- iii. Preventive measures
- iv. Educating the public with traffic rules and regulations

Traffic survey includes finding the number of vehicles passing through the ghat section in the both Peak and Slag hours. Engineering measures includes study on road designing, road lightning, provision of traffic controls, facilities supervision and monitoring centers all theses will lead to decrease in the rate of the accidents.

Educating public is necessary to provide information and education about traffic laws and regulations, safety precautions while driving through ghat section.

Energy generation using roller speed breakers can provide a secondary source which is promising enough to provide early signal system at ghat section. The application of roller speed breaker becomes easy as its fabrication cost is low and it does not need any sufficient efforts. It can be widely accepted at both individual and community levels. The system works as the rollers rotate as soon as they come in contact with moving vehicles which will charge the piezoelectric crystal present in the generator and convert the mechanical pressure moment into electricity, Ultimately giving an output of electric current which is supplied to the IR sensors and LEDs placed at both sides of the road providing an early signal to the vehicles moving on both sides of Dive Ghat.

II. LITERATURE REVIEW

Anil Kumar Joshi¹, Chitra Joshi Road safety is a multi-sectoral and multi-dimensional issue. It incorporates the development and management of road infrastructure, provision of safer vehicles, legislation and law enforcement, mobility planning, provision of health and hospital services,

etc. Road safety includes road infrastructure, vehicular issues, provision of health and hospital services for trauma cases. Road safety is a shared responsibility of the government and a range of civil society stakeholders. The success of road safety strategies in all countries depends upon a broad base of support and common action from all stakeholders. Road traffic accidents (RTA) are responsible for 1.2 million deaths worldwide each year. Moreover, more than 50 millions of people are injured and become permanently disabled. The golden hour philosophy, which was introduced by Dr. R. Adams Cowley in 1961, recognizes that casualties will have a much poorer chance of survival if they are not delivered to definitive care within one hour from the time of the accident. The golden hour includes the time taken for call-out, travel to the incident site, extrication and transport of the patient to hospital. This time-scale has no provision for a lengthy extrication time at the accident scene, if lives are to be saved without much morbidity. In developing countries where traffic management services are not well developed and due to overpopulation, the incidence of accidents is higher than in developed countries. The most commonly affected population in road traffic accidents are pedestrians, cyclists, motorcyclists and users of public transport.

Harshada Targe, Anushka Mahajan While driving on roads at ghat section many drivers faces accident which results them into serious injuries or even death the main reason behind this accident is curves and bends of roads while turning in Ghats. It becomes difficult to see vehicles coming from other lane and turning drivers usually have to assume a way for turning at such critical section this creates a great risk of life other reason for accident in Ghat section is that only one vehicle can turn at turnings at a time. While driving on roads at ghats section many drivers faces accidents which result them into serious injuries or even death. The main reason behind this accidents is curves and bends of road while turning in ghats. It becomes difficult to see vehicle coming from other lane at turning. If two vehicles comes face to face while turning it creates a chance of accidents and it becomes difficult to handle.



Fig 1 Hairpin bend

Sanjay Kumar Singh the main aim of this study is to analyze the road traffic accidents in India at national, state, and metropolitan city level. Focus would be to identify the major road safety issues and discuss countermeasures that would have potential to address the specific road safety problems. The primary source of data for the study is *Accidental Deaths & Suicides in India, 1970 to 2013* published by the National Crime Records Bureau, Ministry of Home Affairs, Government of India, New Delhi. The analysis shows that during the last ten years, road accidental fatalities in India have increased at the rate of 5% per year while the population of the country has increased only at the rate of 1.4% per year. Due to this, fatality risk, road accidental deaths per 100,000 people, has increased from 7.9 in 2003 to 11.2 in 2013. Fatality risk in India is not only quadruple than that in some of the developed countries such as United Kingdom and Sweden but also still increasing rapidly. It is also found that the distribution of road accidental deaths and injuries varies according to age, gender, month and time. Among people of all age groups, people of economically active age group of 30-59 years are the most vulnerable. However, if we compare gender-wise fatalities and accidents, we found that the males accounted for 85.2% of all fatalities and 82.1% of all injuries in 2013.

Piyush Bhagdikar, Shubham This paper attempts to show how energy can be tapped and used at a commonly used system, the road speed breakers. The number of vehicles passing over the speed breaker in roads is increasing day by day. A large amount of energy is wasted at the speed breakers through the dissipation of heat and also through friction, every time a vehicle passes over it. There is great possibility of tapping this energy and generating power by making the speed-breaker as a power generation unit. The generated power can be used for the lamps, near the speed breakers. The present work an attempt has been made to fabricate a ramp, which can utilize the kinetic energy of vehicles in power generation. This type of ramp is best suited for the places where the speed breaker is a necessity. The places like Toll bridges or on vehicle parking stands are best for its utilization. The work also discusses the shortcomings of existing methods and the ways it is countered by this method. The paper is organized as following. Section II describes the scope of the project. Section III discusses the recent works in the same field. Section IV gives an in-depth explanation of each part and then the assembly as a whole with theoretical analysis using ANSYS. Section V explains the working principle of power generation in this setup. Section VI includes the data collected during the experiment. Section VII describes the conclusion of our approach. Section VIII contains information to improve the method and discusses future work.

Aravinda B, Chaithralakshmi C 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, Zoji La 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 In the developing countries accident is the major cause of death. If we gaze at the top 10 dangerous roads in the world we can see that all of them are mountain roads and curve roads. In the mountain roads there will be tight curves and the roads will be narrow. In these kinds of situations the driver of a vehicle cannot see vehicles coming from opposite side. Thousands of people lose their lives each year because of this problem. Since we are talking about mountain roads here other side might be lead to a cliff. The solution for this problem is alerting the driver about the vehicle coming from opposite side. This is done by keeping an ultrasonic sensor in one side of the road before the curve and keeping a LED light after the curve, so that if vehicle comes from one end of the curve sensor senses and LED light glows at the opposite side. By looking at the LED light on/off criteria driver can become alert and can slow down the speed of the vehicle.

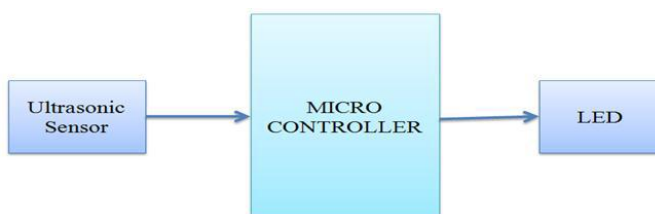


Fig. 2. Block Diagram of connection of components

Mrs. S.S Pitre , Mr. Rahul Raj Energy is the primary need for survival especially for mankind. Everything that happens in the surrounding is the expression of flow of energy in one of the forms. But in this fast moving world, population is increasing day by day and the conventional energy sources are lessening. The extensive usage of energy has resulted in an energy crisis over the few years. Therefore, to overcome this problem we need to implement the techniques of optimal utilization of conventional sources for conservation of energy. This project includes how to utilize the energy which is wasted when the vehicles passes over a speed breaker. Lots of energy is generated when vehicle passes over it. We can tap the energy generated and produce power by using the speed breaker as power generating unit. The kinetic energy of the

moving vehicles can be converted into mechanical energy of the shaft through rack and pinion mechanism which is an electromechanical principle. Then, this mechanical energy will be converted to electrical energy using generator which will be saved with the use of a battery. The energy we save during the day light can be used in the night time for lighting street lights. Therefore, by using this arrangement sufficient energy can be generated to meet various daily need. This work focuses to generate energy from speed breaker by making gear arrangement. To make the system more efficient a pressure transducer i.e. piezoelectric crystal can be used that will convert vehicle pressure into electrical output. The output of system can also be monitored on real time basis using Wi-Fi based module. This will lessen the dependency on energy produced by conventional process to some extent.

Ali Azama, M. Aqeel Aslam It is very significant to design pollution free energy generation system. Speed breaker Power Generator (SBPG) is the most emerging technique which produces electrical power with minimum input. An experimental study to generate the electricity by SBPG is described in this paper. In this system, a rack and pinions mechanism is used for the production of electricity. When a car reaches on the speed breaker, the rack moves downward to generate linear to rotary motion using pinions. The rotary motion is transferred to DC generator which generates DC power which is stored in batteries same as in solar technology. The generated power can be used for the domestic purpose or commercially, which are present near the speed breaker. This examined that SBPG is generating 273.24W on single push under the application of 400kg. In an hour, passing 100 cars of 400kg can generate 54.59 kWh. This mechanism utilizes both downward as well as the upward motion of the rack. During last few decades; electrical energy is the basic requirement of human beings. The ratio of electricity requirement is increasing day by day. But we know that the resources for power generation are limited, and this has caused the energy crisis. The increasing power demand results reduce in conventional resources for power generation and increase the pollutants emissions. It is a need of time to think about non-conventional energy resources or renewable energy resources which are eco-friendly to the environment. In order to minimize the emission of greenhouse gases, renewable energy technologies are widely used for electricity generation. Solar and wind technologies are frequently used for electricity generation. Fig. 1 is rearranged in MS Excel that shows power generation in Pakistan by each sector

Md.Saiful Islam,Syed Khalid Rahman Energy is the basic need for the development of the modern world. For meeting up the regular demand of energy we need to design a system that will produce electricity without destroying the

nature. This paper attempts to show how man has been utilizing and optimizing kinetic energy. Researches show that the world has already had its enough shares of its energy resources. Fossil fuels pollute the environment. Nuclear energy requires careful handling of both raw as well as waste material. The focus now is shifting more and more towards the renewable sources of energy, which are essentially, non-polluting. This paper attempts to show how energy can be produced, stored and used using the road transport pressure or any kind of pressure. The number of vehicles passing over the speed breaker in roads is increasing day by day. There is possibility of tapping the energy and generating power by making the speed breaker as a power generation unit. The generated power can be used for the lamps near the speed breakers and this will be a great boon for the rural villages too.

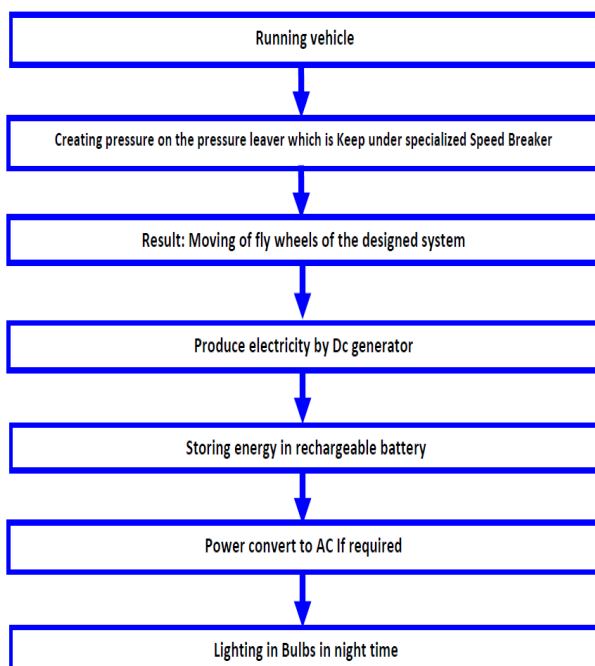


Fig.3 Flowchart of the whole system operation

III. CONCLUSION

"Electricity plays a very important role in our life". Due to population explosion, the current power generation has become insufficient to fulfill our requirements. We have discovered technology to generate electricity from speed breakers in which the system used is reliable and this technique will help conserve our natural resources. In coming days, this will prove a great boon to the world, since it will save a lot of electricity generated from power plants that gets wasted in illuminating the street lights. As the conventional sources are depleting very fast, it's high time to think of alternative resources. We got to save the power gained from the conventional sources for efficient use. So this idea not only

provides alternative but also adds to the economy of the country. Also the generated energy play an important role to provide energy to the smart signaling system and LEDs lights which are the part of entire setup. This signal system will slowly but surely play an important role in reducing the rate as well as number of accidents of ghat sections without external power sources.

REFERENCES

- [1] Anil Kumar Joshi "Road traffic accidents in hilly regions of northern India: What has to be done?" World J Emerg Med, Joshi et al Vol 5, No 2, 2014
- [2] Harshada Targe, Anushka Mahajan, "Advance Road Safety For Ghat Road's At Hairpin Bend" Volume: 05 Issue: 01 | Jan-2018
- [3] Sanjay Kumar Singh "Road Traffic Accidents in India: Issues and Challenges" World Conference on Transport Research - WCTR 2016 Shanghai. 10-15 July 2016
- [4] Piyush Bhagdikar, Shubham Gupta "Generation Of Electricity With The Use Of Speed Breakers" International Journal of Advances in Engineering & Technology, May, 2014.
- [5] Aravinda B, Chaithralakshmi C "Sensor Based Accident Prevention System" IJIREEICE Vol. 4, Issue 6, June 2016
- [6] Mrs. S.S Pitre 1, Mr. Rahul Raj "Electricity Generation Using Speed Breaker" Volume: 05 Issue: 03 | Mar-2018
- [7] Ali Azama,, M. Aqeel Aslamb "Speed Breaker Power Generator" 4th International Conference on Energy, Environment and Sustainable Development 2016 (EESD 2016).