

# SMART ROAD SYSTEM TO ENSURE ROAD ACCIDENTS & TRAFFIC FLOW: AN OVERVIEW

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**Abstract** -The road network system & design of road of a country plays very crucial or vital roles in development & growth in various field like economic, social, cultural etc. So for better & rapid growth for any country we must focus on road condition, design of road, facilities for user & bad road network survey because there are many problem faces by residue people in their daily routine life. Some modern innovative technique and method are previously introduce to make or construct road smarter and resolve all problem likes traffic jams, accidents, injuries & delay due to bad road condition etc. In this paper we are working on those methods and techniques that previously introduce but not get so much of helpful as we accepted. So there is need of improvisation in previously techniques and methods and introduce some more techniques to get out of all problems as much as possible.

**Key Words:** 3d Speed Breaker, Photoluminescence, Downward Breaker, Power Generation, Smart Highway.

## 1. INTRODUCTION

Smart road system, whenever we hear these word, the first thing that strike in our mind is that the road should be free from traffic, it should be free from accident, it shouldn't have any damage or trench on surface, it provide good facilities to road user, traffic flow intensity should be good, it should have proper marking with road indicators and proper sighting of street. As we know very well the condition of Indian road, a survey (conduct by the team of NDTV India) says that in 2013, over 1, 37,000 people were killed in road accidents, that means 16 people die on Indian roads every hours or 377 people die every day in which 16 children die daily on roads accident and 25 % of accident is of two wheeler.[1] These statics was 4 year old so there is no doubt that the ratio is get increased by huge amount. Only one factor i.e accident causes that much impact lets imagine other factors occur on road and how much they cause problem to a country. Although the road getting modernize day by day but still we have limited techniques and technology to ensure road safety & smooth traffic flow in our developing country. Road safety system could have significant impact on our economic growth.

Following are the factors affecting road system; improper design of road pavements, low visibility due to heavy fog, improper marking of road, sight distance, speed breaker,

lack of street light, road user behavior or mentality, banking of road, and many other which cause traffic jams, delays, and accidents.

Speed breaker are used to slow down the vehicles speed and prevent accident by providing jerk to vehicles but we shall be able to use breaker as a power generation as well as to slow down speed also[2].

Marking on road and road indicator is use to show the direction and edges of road. They are mainly important on cities roads and intersections as there is the maximum chance road accident and increase in traffic volume value and also promote road safety and bring out smooth and harmonious flow of traffic along guided paths of travel but due to lack of street lights; the visibility of road marking is very low at night time. So its need to be improves by using fluorescent or photoluminescence. [3]

Now days in India, speed breaker is replace by 3D painting speed breaker which give effect of illusion from long distance and helps to slow down the speed of vehicles without any reflex action. But the illusion effect is not long lasting for residue people, after some time people will know there is no jerk so let the vehicle maintain the speed and chance of accident get increased. "In India 20 % of accident occurs due to speed breaker, there is 30 crashes everyday just because of improper breaker in which 9 people die each day. In 2015 3,409 deaths were reported due to speed breaker". [4]

## 2. LITERATURE REVIEW

While working on this case study there are many paper had been gone through, here are some of them which describe the categories and some of the factors which are mostly responsible for the accident and traffic jams and helps to reduce their effect. They are-

**Mr. Gunanithy.s, Prof. S.Nagarajan:** This work is mainly focused on to give the detailed survey of power generation mechanism through renewable energy resources by making an analysis on the Roller mechanisms that will worker as a speed breaker. Some software is also used for modeling of mechanism and analysis of power generation so that the cost will low and material is to be low weighted. This also gives full explanation of working principal of project

The study gives an alternative way to generate electricity by using roller mechanism (as a speed breaker) without any fuel or fossil fuel consumption. [2]

**Sajib k.mistry, R. karim, k.sakib & M.H kamal;** this case study is based on smart highway system (SHS) to ensure road accident and let the people knows further condition of road by using wireless sensor network.

The smart highway system is design on the basis of wireless sensor network with three main components' vehicle detector/ indicator sensor, information passing sensor and a station/ sink node. The mechanisms help us to reduce road accident. This work will help in the growth of country by reduce traffic jams and road accident [7]

**N. N. Ghuge, Aarti sathe, varsha patil, Anagha warankar:** The aim is to generate electricity through speed breaker mechanism. That will help to reduces uses of non-renewable resources like fossil fuel, which are used for generating electricity.

A speed breaker is replace by cylinder roller which will rotate when vehicle pass over through it. And one end of roller is connected motor with connecting. This mechanism helps to produce electricity [6]

**Anshu Adwani, Kirti H. Madan, Rohit Hande:** In this study, author proposed a system to deal with present situation of road problem like W.A.L.T (Weather, accident, landslides, traffic) by using of digital sensor that will displayed acquired data on active LED display with XBee and GSM technology

The case study proposed for monitoring the accident on road. Landslide and water overflow on over bridge is detected with the help of different sensors. So that road user will easy selected fastest root without any delay. [8]

**Monika Másilková :** This study is to analyze the health and social consequences of road traffic accidents. The selected method of data processing was textual analysis of documents

The theme of the consequences of road traffic accidents has been, and still is, on the front burner. Despite the fact that many states have gradually introduced harsher sanctions and measures to reduce traffic accidents, many people continue to die in traffic accidents and even more people suffer permanent consequences. Finally, a road traffic accident is a burden on the economy of a state. According to the literature, health consequences can be generally defined as all injuries associated with traffic accidents that result in long-term or permanent harm. Social consequences of accidents include the change of the quality of life of an individual, and the change in the social, family and professional life of an individual after a traffic accident, including changes in attitudes towards life

## 4. PROJECT DETAILED

### 4.1 Power generation through speed breaker [6]

Present breakers are design in semicircular or semi oval shape in upward direction but for power generation we are designing a breaker in downward direction with long cylinder shape steel bars with specific diameter.

A breaker contain five steel bars (shaft) whose both side is joint with bears for providing relative motion to steel bar when vehicles passes over the circular shaft (steel bars) its tends to rotated on their axis of rotation due to friction between tires and circular shaft. Each shat (steel bars) is interconnected with connecting belt for maintaining rpm (rotation per minute) throughout the breakers.

The depth depend on minimum base clearance of most used vehicles and the length is carried out by the size of tires of most used vehicles of that area with considering factor of safety, and the arrangement of shafts (steel bars) in a such way that design length and depth will appear automatically.

### 4.2 3D speed breakers

This concept is totally new and innovative to provide long distance illusion without any jerk to vehicles. But the effect of illusion is not long lasting for residue people, so need to be design well. Instead of replacing speed breaker with 3D painting we will reduce the height of breaker in such way that low base clearance vehicle pass through it easily with les jerk and provide 3D paint on it so that it give illusion height of breaker

When a road user is going to pass breaker they will able to visualize height of breaker and will reduce speed. Basically it's an intermediate stage of 3D painting speed breaker and normal speed breaker which give effective illusion as well as minimum jerk.

### 4.3 Road Marking and Indicator

Road markings are used as a means of controlling and guiding traffic. They are highly important on urban roads and intersections as they promote road safety and bring out smooth and harmonious flow of traffic along guided paths of travel. [3]

In winter season, fogs are very heavy hence the visibility of road marking is very low which causes increment in traffic volume and promote chances of accident and same case appear also in night time.

To make road marking more visible during winter season and night time, we should replace normal paint (thermoplastic paint) with fluorescent paint that will glow in

when light reflect on it. This technique will increase visibility of road marking an ensure road accident and traffic flow. [6]

## 5. ATTRIBUTE OF SMART ROAD:

The attributes with a direct influence on road design, construction and maintenance. It classify into two category are as follows-

### 5.1 Structural attributes:

Smart Roads are associated with structural aspects such as, although not limited to, the following

- Optimal environmental integration and energy efficiency
- Optimal service quality
- Economic sustainability
- Improved safety
- Coverage of externalities
- Assurance of regional cohesion
- Social commitment
- Economic contribution
- Provide alternative use of non-renewable resource
- Technology and innovation
- Proper guidance and controlling [7]

### 5.2 Emotional attribute:

Smart road is also attributes emotionally associated with new concept, are as follows

- Reliability
- Safety
- Security
- Comfort
- Modernity
- Freedom [7]

## 6. CONCLUSION

In this paper, we introduce an innovative idea or concept and methods to minimize the road accident, traffic volume and road casualties with utilizing road for electricity generation and other factor and also improvisation and give attention to pervious method and concept.

## REFERENCES

[1] <http://sites.ndtv.com/roadsafety/important-feature-to-you-in-your-car-5/>

[2] Mr. Gunanithy.s, Prof. S.Nagarajan, "Simulation of power generation from speed breaker using roller mechanism" international journal of engineering science & resreach technology. DOI: 10.5281/zenodo.51441.

[3]"Dehli development authority"  
<http://uttipecc.nic.in/writereaddata/mainlinkFile/File208.pdf>

[4] <https://www.rushlane.com/speed-breaker-related-accidents-12244997.html>

[5] "smart transportation alliance" <http://smart-transportation.org/>

[6] "Every breaker is a source of power" Arati Sathe et al Int. Journal of Engineering Research and Applications [www.ijera.com](http://www.ijera.com) ISSN : 2248-9622, Vol. 4, Issue 3, March 2014, pp.01-05.

[7]Sajib K.mistry. "Smart highway system to ensure safety services using wireless sensor network" Asian journal of information technologies 8(4-12); 118-124,2009 ISSN: 1682-3915.

[8] Anshu Adwani, Kirti H. Madan, Rohit Hande "smart highway system for future cities" international journal of innovative research in computer and commucation engineering" vol. 3, issue 7, july 2015

[9] Monika Másilková "Health and social consequence of road traffic accident" University of South Bohemia in České Budějovice, Faculty of Health and Social Sciences, Department of Radiology, Toxicology and Civil Protection, České Budějovice, Czechia.