

ANALYSIS AND STUDY OF USE OF LIGHT REFLECTIVE STICKERS ON SPEED BREAKERS TO AVOID SUDDEN ACCIDENTS

Gaurav Sidar ^{1*}, Nupoor Dewangan ²

¹M. Tech Scholar, Department of Civil Engineering, Shri Shankaracharya Technical Campus, Junwani, Bhilai.

²Assistant Professor, Department of Civil Engineering, Shri Shankaracharya Technical Campus, Junwani, Bhilai.

Abstract

In India, speed breakers certainly kill more people than they save. According to data from the Ministry of Roads and Transport, these road "safety devices" cause 30 accidents every day, killing at least nine people. That's the two-year average since the government began collecting statistics on speed breakers in 2014. Last year's figures have not yet been released, but government sources believe they can be compared. 3,409 in 2015 is more than all road accidents in Australia and the UK combined (2,937 fatalities in 2015). Poor design, poorly made materials, no clear markings and harmful to drivers. Federal road transport minister Nitin Gadkari admitted: "This is a problem across the country. We have speed breakers on every road that can break bones and wreck cars." Speed breakers are governed by law. These rules and design standards are unknown to many government officials and even drivers. To avoid this scenario, implementing a method of placing reflectors on all uneven speed breakers so that the driver sees a clear reflection of the screen and notices before approaching the speed breaker. Drivers can use this strategy to slow down and take necessary precautions to avoid accidents. Additionally, Vibration sensors and Emergency sms sending system in case of accident can also be implemented to increase lifesaving factor.

Keywords: *Light Reflective, Speed Breakers, Accidents, Safety Devices.*

* Corresponding author

1. INTRODUCTION

Different types of roads are subject to specific design speeds that vehicles must adhere to in order for the highway system to function properly. A special control mechanism is used to ensure proper speed is maintained. These methods can increase traffic while increasing safety and convenience.

Speed breakers should only be installed on narrow roads and residential areas in big cities. Outside of big cities, speed breakers are not recommended on freeways and highways. As you can see locally, many sites use illegal speed breakers (branch breakers made by local people, not the government). Most of the time there are no street lights to highlight the speed breakers. Drivers of fast cars are unaware of speed breakers in front due to the

lack of road lighting and lack of full knowledge of speed breaker signs. Therefore, in such a situation, if the driver approaches at a high speed, he detects the front speed breaker at a distance of at least 10 meters and brakes immediately. Skidding of a vehicle (usually two wheels) or vehicle imbalance can occur as a result of heavy braking and lead to serious accidents. A simple solution to avoid these scenarios is to indicate whether to install some signs or indicators... to let the vehicle know that the speed breaker is approaching. As shown, legal speed breakers have appropriate markings and signs, but illegal speed breakers do not. Governments are now removing illegal speed limits, but removing all speed breakers will take time and money. In one place, there are 5 legal speed breakers and 15 illegal speed breakers. Therefore, after calculating all illegal bumps in a particular location, these heights should be marked with reflectors to warn drivers of impending speed bumps and reduce the number of accidents. Bumps Since it takes about 6 to 12 months from the official inspection of illegal speed bumps to the start of removal, reflectors must be attached to unnecessary speed bumps, and it is likely that many fatal accidents occur during that time due to unnecessary bumps. to give Therefore, in this study, the analytical measurements of car speedometer before and after placing the reflector label are observed and recorded as a conclusion. To calculate the speed of the car, an information recording system with ultrasonic sensors is used to detect the time interval between two ultrasonic sensors.

1.1 Objective of the Paper

- 1) To use a Ultrasonic Based Speed measuring device or data logger to measure the speed of incoming vehicles before and after speed breaker.
- 2) Use of Vibration sensor and sms sending Module to increase the life expectancy in case of any accident.

2. LITERATURE REVIEW

2.1 Background

- 1) Past accidents caused by unnecessary speed breakers:

Delhi, New Delhi: Arguably, speed breakers are killing more people than they are saving in India. According to data from the Ministry of Roads and Transport, these road "safety devices" cause 30 accidents every day, killing at least nine people. That's the average for the past two years since the government began collecting statistics on speed breakers in 2014. Last year's figures have not yet been released, but government sources believe they can be compared. In fact, India has more speeding deaths (3,409 in 2015) than all road accidents in Australia and the UK combined (2,937 deaths in 2015). Poor design, poorly made materials, no clear markings and harmful to drivers. "This is a nationwide problem. We have speed breakers on every road that can break your bones and wreck your car."

- 2) India registers highest no of deaths due to speed-breaker related accidents.

According to data provided by India's Ministry of Road Transport, speeding causes 30 accidents a day in India. Yes, 30 accidents happen every day in India due to speed breakers. And it is not.

These incidents can also lead to death. Every day 9 people die in India due to accidents related to speed breakers. In 2015, 3,409 people died due to speed bumps. This means India has more speed-related deaths than the UK and Australia combined!

Indian roads are the most dangerous roads in the world. In 2015, about 1.47 million people died in road accidents in India. This number for Australia and Great Britain is a total of 2937. Unfortunately, Indian officials believe adding speed breakers is the solution. But according to statistics, this is not the case.

3) Speed breakers in India kill more people than accident do in UK, Australia In 2014, the government began collecting statistics on speeding accidents. The statistics are dire. According to The Times of India, speeding causes 30 accidents and 9 deaths a day. According to the ministry's data, speeding caused 11,008 accidents in 2014 and 11,084 in 2015. In fact, speeding kills more than all road accidents in Australia and the UK combined (2,937 deaths in 2015). Even more worrisome is the possibility that these data are understated. Speeding accidents may be combined with traffic accidents and are not recorded separately. This is due to poor materials, poor design and lack of noticeable display. The Indian Roads Council (IRC) admits in its rules that there is "no specific design" suitable for all vehicles on the road. Based on field surveys and research reports, IRC suggested a design suitable for normal Indian highway traffic. For the recommended passing speed of 25 km/h for normal traffic, the speed breaker should be a round hump with a radius of 17 m, a width of 3.7 m and a height of 0.1 m. In addition, approaching speed breaker warning signs should be installed and the hump itself should be painted black and white so that approaching vehicles can easily recognize it.

4) Petition in Chhattisgarh for unwanted Speed Breakers The petitioner claims that as far as he knows, speed breakers cannot be built on the country's highways, and the Ministry of Road Transport and Highways has ordered all states and necessary bodies to remove speed breakers from national highways. The number of casualties caused by speed breakers. The complainant also cited the Road Transport and Highways Ministry's annual report on road accidents in India in 2016, which attributed 9,583 accidents and 3,396 "accidental deaths" to speed breakers. I'm here. In the case of Chhattisgarh data, the petitioners argue that speed breakers cannot be constructed unless a permit is issued by a commission called 'ZilaSadakSurakshaSamiti'. Research on speed breakers (2017) Department of Civil Engineering, Faculty of Engineering, Ahmedabad. Research has shown that speed breakers are an effective technique not only for limiting speed, but also for minimizing the frequency and severity of crashes. This is despite the fact that in some areas the regulations are not followed and they are placed randomly, which also causes accidents. Speed charts are provided on public transport routes, such as BRTS lines near stations, where transport vehicles are already slow. Not only will operating costs increase, but it will also cause serious inconvenience to passengers. It is also suggested to monitor its effect on post-admission comfort. In India, there is a significant need for thorough pre- and post-implementation studies of speed breakers to assess their effectiveness.

3. METHODOLOGY

3.1 Methods used For this Study is as Follows

The methods used to test the project's functionality are as follows:

- 1) Applying a reflective sticker to the speed bumps.
- 2) If the speed breaker reflective sticker has not been worked on, it can be placed on the left side in a vertical position.
- 3) Following the application of reflective stickers on speed breakers, the following steps must be taken to ensure the correct operation of this approach.
 - a) From 50 metres ahead, drivers should be able to notice the reflective stickers' light reflection.
 - b) Without stickers, drivers' speeds may be excessive due to the invisibility of speed breakers.
 - c) Due to the visibility of the Reflective plate indicator after installing the Reflective stickers on the Speed Breaker/side at vertical position, the speed of vehicles should be lowered after placing the Reflective stickers on the Speed Breaker/side at vertical position.
 - d) A speed measurement and data logging equipment should be used to measure the speed differential before and after the placement of the reflective sticker.
 - e) Additional Beneficiary method like Emergency sms sending in case of any accident near the Speed Beaker is included.
 - f) A Vibration sensor is used to detect the amount of shock generated by the crossing vehicles near the speed breaker.
 - g) Vibration Level is Readed and an average vibration value for a particular area is noted and used in the system for normal or abnormal vibration or shock values.
 - h) In case of any abnormal or shock values greater than the noted average vibration value is detected, it will automatically send an emergency sms to any particular programmed cell phone or service number (Mostly police station, ambulance for inspection and providing medical facility as soon as possible to the injured person.

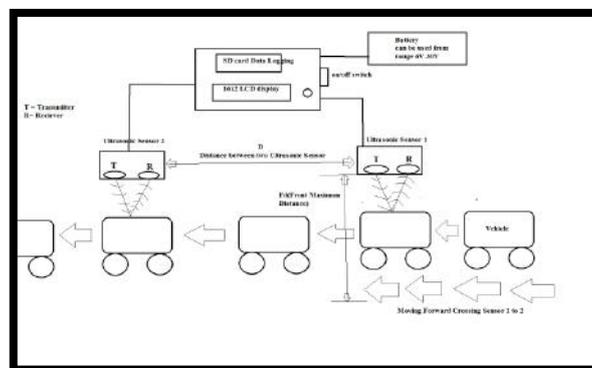


Fig 3.1: Method used to measure the speed of vehicle crossing through two ultrasonic sensors.

3.2 Method Process

1. Locating a location where an undesired speed breaker is being employed without any rules, in a dark area with no street lighting.
2. Applying reflective tape on the speed breaker to alert drivers to the existence of a speed bump.
3. Testing the speed of cars crossing the speed breaker in the absence of reflective tape.
4. As well as evaluating vehicle speeds after installing reflective tape on speed bumps.
5. The estimated speed of cars should have been decreased as a result of their awareness of the speed bump in front of them.
6. The cars' speed will be high if reflective tape is not used.
7. Using a data logger device to read and collect vehicle speed data before and after the application of reflective tape.
8. Comparing graphs created from tabular recorded data between vehicle speed and time of crossing before and after reflective tape deployment.
9. By comparing the graphs and statistics, it is obvious that installing a simple reflective panel can protect the vehicle from a sudden collision caused by speed breakers.

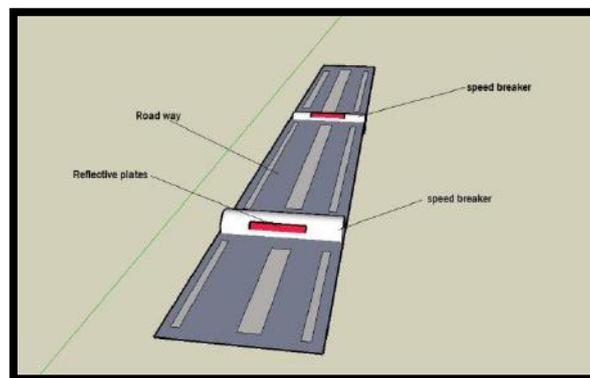


Fig 3.2: use of Reflective Tape on speed Breakers

4. RESULT AND CONCLUSION

Placement of Data Logger on Two-wheeler

The data logger device is designed to be portable for ease of mobility and reading recording. All of the components are secured inside a plastic enclosure. It is a battery-powered gadget that may be powered by an external battery or the vehicle's internal battery. This gadget is equipped with two ultrasonic sensors. They operate on the ultrasonic proximity concept.



Fig 4.1: DATA Logger with battery powered placed on the two-wheeler

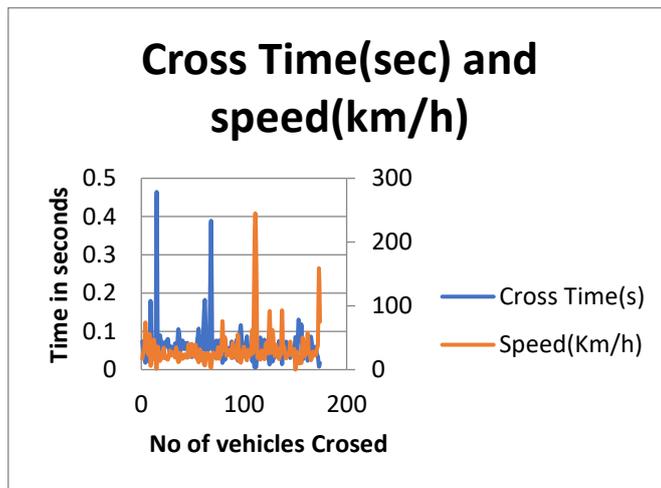


Fig 4.2: Graph comparison between cross time and speed of vehicles

According to the comparison graph, anytime the speed rises, the cross time reduces, proving the relationship between speed and time, as $speed = distance / time$.

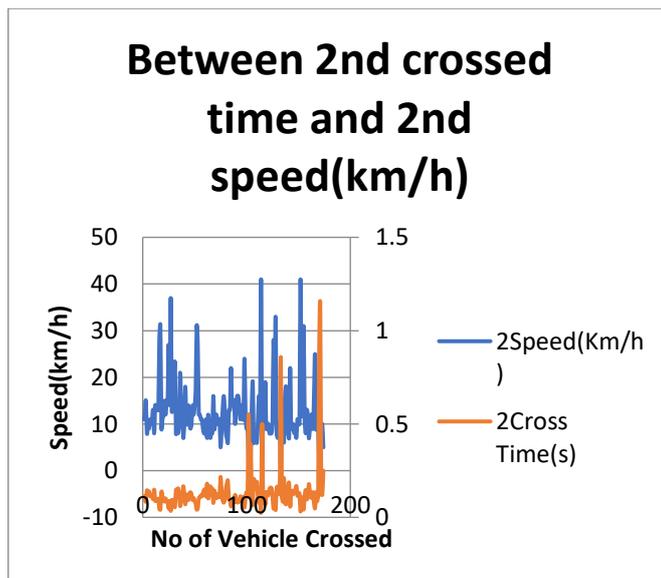


Fig 4.19: Relation between Speed and Cross time of vehicles after Reflective tape placement

5. CONCLUSION

According to the speed Comparison Graphs Before and After Reflective Tape Placement, the speed (km/h) graph is greater than the 2speed (km/h) graph. As a result of this graphical depiction, it is obvious that a non-metalized reflective tape can be utilized for indication or alertness purposes at any unlawful or undesirable speed breakers. It is obvious from observation that when reflective tape pieces are employed on the speed breaker, the tape displaces from its placements and eventually loses its reflecting ability due to the constant movement of vehicles over it. Reflective tapes or paints should be put on every vertical stand at the side of the road for long life awareness. It cannot inform all drivers since some are unable to look at the side area.

However, this strategy decreases the speed of around 80-90 percent of drivers. The biggest issue at the undesirable speed breakers is not the speed breakers, but the speed of the vehicles. If a motorist crosses a speed breaker without slowing down, several fatalities can occur, such as a quick jolt that can shatter the spinal cord or unbalance the vehicle, resulting in severe injuries. As a result, a speed lowering mechanism that is inexpensive enough to be applied at all undesirable speed breakers is required. Looking at the cross-time comparison graph, the second time implies that after the installation of reflective tapes, the cross time is lowered, implying that cars take longer time to pass through the speed breaker and vice versa. So, based on this project's observations and testing, it is determined that a simple reflective tape can be useful in preventing abrupt road accidents caused by cars crossing at excessive speeds from undesirable or any speed breakers.

REFERENCES

- [1] Peden, M.M., Krug, E., Mohan, D., Hyder, A., Norton, R., MacKay, M., and Dora, C., Five-Year Who Strategy on Road Traffic Injury Prevention World Health Organization, Geneva (2001). Ref: WHO/NMH/VIP/01.03
- [2] Tiwari, G., Indian case studies of traffic calming measures on National and State highways, Transportation Research and Injury Prevention Program,(2009).
- [3] IRC: 99-1988, Tentative Guidelines On The Provision Of Speed Breakers For Control Of Vehicular Speeds On Minor Roads, The Indian Road Congress,(1996).
- [4] Pau, M., Silvano A., Do Speed Bumps Decrease Traffic Speed? An Italian Experience. Accident Analysis and Prevention 33(5)(2001) 585-597. [https://doi.org/10.1016/S0001-4575\(00\)00070-1](https://doi.org/10.1016/S0001-4575(00)00070-1)
- [5] Zaidel, D., Hakkert, A.S., Pistiner, A.H., The Use of Road Humps for Moderating Speeds on Urban Streets Accident Analysis and Prevention, 24(1)(1992) 45-56.
- [6] Parkhill, M., Sooklall, R., Bahar, G., Guidelines for the Design and Application of Speed Humps, Washington, Dc, Institute of Transportation Engineers Traffic Engineering Council, (2007).
- [7] Zhu, P. Y., Hessling, J. P., Liu, D. S., Optimal road hump for comfortable speed reduction, Proc. SPIE 7130, Fourth International Symposium on Precision Mechanical Measurements, 71304L (31 December 2008); <https://doi.org/10.1117/12.819725>.

- [8] Original Traffic control sketch made by Compton in 1953 ,Washington University Libraries. Archived from the original on 2010-06-15.Retrieved 2014-03-14.http://library.wustl.edu/units/spec/archives/facts/images/traffic_control_sketch_1953.pdf.
- [9] Watts, G. R., Road humps for the control of vehicle speeds TRRL Laboratory report 597(1973).
- [10] Lawson, R. W., The Objections to Speed Humps, Published by the Bromley Borough Roads Action Group (B.B.R.A.G.), (2003). <http://www.bromleytransport.org.uk>
- [11] Hessling, J., Zhu, P., Analysis of vehicle rotation during passage over-speed control road humps, *Intelligent Computation Technology and Automation (ICICTA)*, 1(2008) 304–308, <https://doi.org/10.1109/ICICTA.2008.311>
- [12] Munjin, M.A., Zamorano, J.J., Marre, B., Ilabaca, F., Ballesteros, V., Martinez, C., Yurac, R., Urzua, A., Lecaros, M., Fleiderman, J., Garcia, N., Speed hump spine fractures: Injury mechanism and case series, *Journal of Spinal Disorders and Techniques* 24(6)386-389, 201. DOI: 10.1097/BSD.0b013e3182019dda.