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Advanced Rolling Barrier and In lane Rumble Strips

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ABSTRACT: Though the rolling barrier is better in terms of costing, easy to set, much safer than concrete barrier, steel barrier, cable barrier, impact absorb barrier. Rolling barriers have the same advantages of cable barrier, impact absorb barrier and steel barrier. But rolling barriers has also some problems. Such as, the maintenance cost of rolling barrier is very high. After crashes the roller is totally damaged. Though it can be recycling again but it has to change immediately after a major crash. Because of heavy and repeated maintenance, there should need a good number of workers for changing it. Though the changing process is much easier. After hit the barrier by a heavy truck or car, there occurs a permanent deformation in the steels. Though it can change easily and it will not affect the barrier much. This is one of the great problems of rolling barrier. The roller is made by hard rubber type materials. When summers, the temperature also higher than before. So, the roller losing its durability or hardness. So, it should be in regular check and proper maintenance. Several concerns have been raised regarding the use of rumble strips in the travel lane. The intent of a rumble strip is to gain the attention of a driver. Naturally, the by-product of this measure is a loud rumbling noise. In isolated areas, this usually is not a problem. However, when installed in a suburban or urban area, the noise from the rumble strips can be quite disruptive to nearby residents.

KEYWORDS: accidents, transportation, optimisation, safety barriers.

I. INTRODUCTION

The Rolling Barriers are the barrier that absorbs impact energy and converts that impact energy into rotational energy and directs the vehicles forward rather than potentially breaking through an immovable barrier. In-lane rumble strips are installed in or on the driving lane, perpendicular to the traveling vehicle, in order to alert a driver of changing road conditions (i.e., a STOP condition, a railroad crossing, road divergence, etc.). In-lane rumble strips can cover the entire driving lane or can be set up to only run the width of a vehicle's wheel path. Road accidents continue to be a leading cause of death, disabilities and hospitalization in the country despite our commitment and efforts. India ranks first in the number of road accident deaths across the 199 countries and accounts for almost 11% of the accident-related deaths in the World. National Highways which comprise of 2.03 percent of total road network, continued to account for a disproportionate share of 35.7 per cent of deaths in 2019 pointing to need for improved enforcement and correctives to be put on National Highways. State Highways which account for 3.01% of the road length accounted for 24.8 percent of deaths. Other Roads which constitute about 95 % of the total roads were responsible for the balance 39% deaths respectively, and electronic monitoring of the same. Even though efforts are being made by the Govt. to reduce the severity of road accidents but the results have not been significantly fruitful. Primarily it is based on 4 E's i.e., Education, Engineering, Enforcement and Emergency care. Nearly 700 Accidents prone spot have been found out by Ministry of Road Transport and Highways (MoRTH) Many researchers have thus come forward and have investigated. Kim et al (2004) in a study concluded that the use of longitudinal barriers results in reduction of the accidents by more than

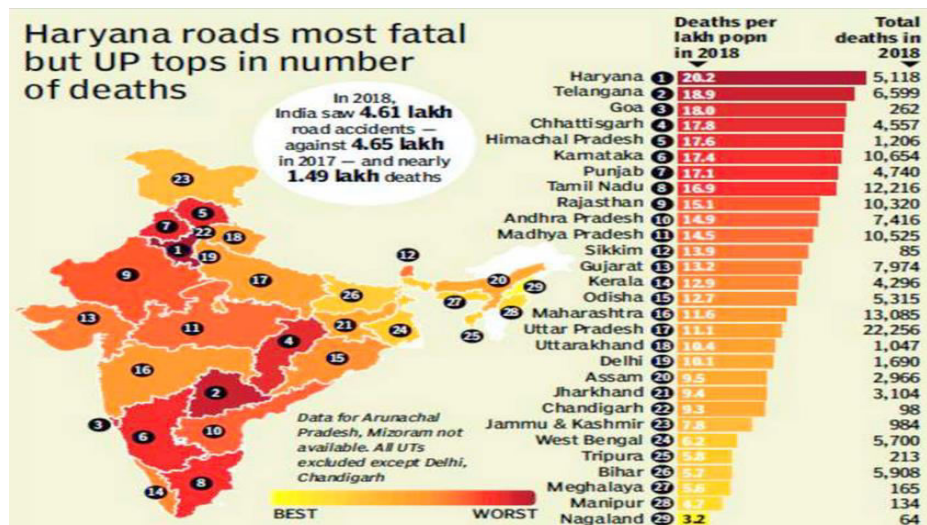


Fig1.0 Number of road deaths recorded in UP, Gujarat, Maharashtra, Orissa, Punjab and Chhattisgarh.

50 percent in a year. In a strength performance test of the 8-ton truck, and in a passenger protection test with 1.3-ton passenger car, the RB satisfies the MOCT's Guidelines for Installation and Management of Road Safety Facilities. Outcalt (2001) reported on milled rumble strips installed at the centreline of a 27-km two-lane section of State Highway 119 in Colorado. He found that the rumble strips reduced accidents per million vehicles by 34% for head-on collisions and 36% for sideswipe accidents. This research aims to evaluate the effectiveness of In Lane Rumble Strips and Rolling Barrier against head-on collisions and safety measures.



Fig1.1 Rolling Barrier

II. RELATED WORK

- 1) Our aim is to provide road safety information for road users to encourage safer road user behaviour among current and prospective road users and reduce the number of people killed and injured on our roads every year.
- 2) To study the improving safety on the road network.
- 3) To Planning a highway network for safe, efficient and fast movement of people and goods.
- 4) The primary objective of this study is to investigate and reduce head on collision, accident which can harm public health and
- 5) Also reduce the death rate of the country like i.e., India.
- 6) This research focuses on studying the effect of the Rolling Barrier which can be effectively used in curved roads sections, ramps, medians and entrance or exit ramps in parking garages.
- 7) Test performance comparison during crushing between conventional barriers and Rolling barriers in-lane in Rumble Strip.

8) Study the influence of Rumble Strip (also known as sleeper lines or alert strips) are a road safety feature to alert inattentive drivers of potential danger.

9) Basically, Rumble Strip can be installing in 2 ways Shoulder Rumble Strips prevent off-Road crashes and Center Rumble Strip prevent Head-On collisions which are generally installed in the middle of the roads.

10) This study aims to evaluate the effectiveness of the Rolling Barriers, and Rumble Strips to understand the RB's features in crash cushioning, and with the help of Rumble Strip correcting the vehicle's directions and required strength of the barriers.

III. METHODOLOGY

In this Case Studie an attempt would be made to the use of modern technological innovations like the rolling barrier system and rumble strip on the Mumbai-Pune expressway can help reduce accidents, diminish fatalities and also stimulate national growth. It will not only reduce the impact of collision but also help in redirecting to the actual path, by converting the impact energy into rotational energy. Considering the diverse terrain of the expressway, there can be several solutions to address the problem. The conventional barrier system which includes the likes of concrete barriers as well as the steel guardrails try to absorb as much shock energy from the impact of collision as possible and thus potentially break the momentum of the colliding vehicle. However, as we can see from the number of fatal accidents on the expressway, this prevailing customary system has proven to be substandard. Whereas, the rolling barriers not only absorb the impact energy but also convert it into rotational energy, assisting the vehicle to stay on track and prevent overturning.

• System Component- Top & Bottom Rails

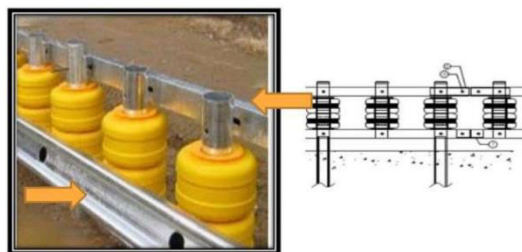


Fig1.2 Rolling Barrier Top- Bottom View

IV. EXPERIMENTAL RESULTS

TEST SB5 crash test level]

Passenger safety performance

- Theoretical head impact velocity (THIV): 32.4km/hr (below 33km/hr)
- Post impact head deceleration (THD): 9.9 m/s⁻² (below 20 m/s⁻²) Scatter prevention performance
- No scatters of the fifty barriers. Test vehicle behaviour performance
- Not over thrown or a sudden stop after collision.
- 76.9% (Exit speed: 74.8km/hr): 43.7% (Exit angle: 8.74 degree)

Synthetic results satisfied with criteria.

Small car:

• 900 kg car, 200 side collision during the evaluation, it was observed that the ETI product sends an accident vehicle back to the normal moving track, protects occupants and second vehicle accidents.

Large Car:

10-ton truck, 150 side collision during the evaluation, it was observed that the ETI product changes the collision method to rotational friction to make collision continue for a long time and thus minimize momentary shock.

Bus:

- 13-ton bus, 200 side collision during the evaluation, it was observed that the ETI product changes the collision method to rotational friction to make collision continue for a long time and minimize momentary shock.

MASH 4-10 Testing



Fig1.3 Mash 4-10 Testing

MASH 4-11 Testing



Activat

Fig1.4 Mash 4-11 testing

The Barrier..... Installations

UNIVERSAL APPLICATIONS Median / centre lines between opposing traffic, managed lane separation, curved median strips, curved ramps, diverging points, curved downhill corners, hillside locations, school zones and danger & protection zones etc.



Current Installation	Pending Installation
Korea	USA
Thailand	India
Australia	UAE
	Taiwan
	Singapore
	Malaysia
	Peru
	Argentina
	Sri Lanka

Activate Window
Go to Settings to activate

Fig1.5 countries installed Barriers



V. CONCLUSION

The accidents are the errors which are occurred or done by humans while on the usage of motor vehicles and also sometimes the nature creates problems like rainy and cold weather conditions for slippery surfaces of roads, which will create chaos situations and tends to hit the other vehicles or hit the barriers installed on the outer edge of the roads. There have some different of accident and crash. Accident means it just happened there had no way to prevent the accident but crash means it can be prevented the occurrence or can improve the situation to prevent the accident. These barriers are of different types and have their own characteristic features but the new idea is about the installations of the rolling barrier systems which will stop the accidents occurring to surpass the road to gravel or steep hill down or other part of the road, and also saves life of the people present inside the vehicle. As above explanations of barriers and their proofs tells us that the rolling barrier systems are a high priority towards safety, better than other types of barriers in terms of stiffness and strength, high positive results in the crash test performances, etc. Ultimately life is more precious than vehicles but when it comes to rolling barrier system usage, its safes life and also prevents maximum damage level of the vehicles. The rolling barrier systems are the future technology in Civil Engineering or Transportation Engineering.

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