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Study of Low Cost Rolling Barrier System

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Abstract: ***India is a developing country. The rise in traffic swiftly day by day. The Government is looking for the new technologies in order to reduce the accidents on the roads and improve the safety of the road user. In 501423 road accidents 146133 people lost their lives in 2015 and in 2016 480652 accidents having 150785 deaths. In 2017 road crash fatalities increases by 3% in last 2 years.Rolling barrier also called as longitudinal barrier has pipes covered with urethane rings. A study is carried out to explain its need in India for using Rolling Barrier which will minimize the accident rate. The guardrail deflects and stop the vehicle. Speeds affects its performance.The barrier deflects the vehicle and stops it from crossing the barrier. The rolling barrier being very effective and efficient has reduced flat road accidents, raps, enter parking garages, etc. and also used in mountainous terrain. The product (rolling barrier system) developed by Korean company is very expensive so to overcome the price of barrier system we are replacing w-beam guard rail by steel pipe guard rail which has low cost and equal strength. Also, we decided to replace the LED lights used by Korean company with radium paper which will do the same purpose but at a very low cost.*** [2]

Keywords: Government, Accidents, Safe barrier, Rolling Barrier, highways, Expressway, etc

1. Introduction

In 2015 accidents were 501423 as compared to 489400 in 2014. A rise of 2.5% increase in road accidents was observed. A total of 139671 people in 2014 and 146133 people in 2015 died in road accidents it was a 4.6% increase the road accidents are the cause of human error, the road.Over speeding, over taking, drunken driving and distraction to the driver are major causes of accidents. Most of the Road user is familiar with the general Safety measures but it is due to the causality of road user's accidents take place.A Korean company came up with new concept to reduce road accidents. Roller barrier consist of a long pipe called urethane rings.The urethane ring resembles an abacus which is erect; conversion of shock energy to rotational energy is the principle of roller barrier.The barrier stops the vehicle thus, preventing it from overturning and crossing the barrier and also corrects the vehicle direction. The product (rolling barrier system) developed by Korean company is very expensive so to overcome the price of barrier system we are replacing w-beam guard rail by steel pipe guard rail which has low cost and equal strength. Also, we decided to replace the LED lights used by Korean company with radium paper which will do the same purpose but at a very low cost. [1]

2. Working of Rolling Barrier

Flexibility and semi- rigidness are properties of rolling barrier, rolling barrier operates in a unique way it provides more safety to vehicles in hilly curves, rolling barrier have urethane material. This urethane material due to its physical and mechanical properties are used in many fields. When a vehicle collides with rolling barrier the mechanical energy of vehicle is converted into rotational energy, which saves the vehicle from falling into deep valley from curves of hilly regions.

1) Rollers of rolling barriers.
2) Front rail of rolling barriers.
3) Back rail of rolling barriers.
4) Vertical post of rolling barriers which are provided to give strength to the arrangement. [1]

3. Uses of Rolling Barrier

1) Roadside barriers are typically installed to prevent errant vehicles from colliding with hazardous roadside objects such as signs trees, abutments (bridge, pier), rock outcrops, culverts, bodies of water, embankments, cliffs, ditches, electricity substations, retaining walls, poles etc. [3]
2) Roadside barriers are also sometimes used to protect pedestrians, bystanders or property. Road safety apparatus are required to protect drivers, passengers, as well as other road users in case of an accident. [3]
3) In the case of a steep decline, a truck may experience a braking malfunction and start rolling down the road like a runaway train.The vehicle driver might not be aware of such an emergency on the other side of the lane. At a sharp bend, the truck may be unable to steer the vehicle as appropriate and could drive straight to the other lane, thereby endangering the lives. [3]
4) A properly fabricated road divider can stop the truck from crossing over and knocking the oncoming traffic. The barriers also provide protection on slippery roads due to snow or rainfall. Fixed road bollards significantly minimize the risks of major accidents as a result of placing of permanent road barriers along strategic and high-risk sections of the highway. [3]
5) As such, your business premises, as well as your employees and customers, are safely protected from ram-raiders.An out of control vehicle is protected from confronting the opposite traffic by breaching the middle lane. For this reason, a continuous fixed road barrier is Typically erected to divide the two sections of the road. [3]

4. Result

We have different traditional barriers are mostly we seen road side. First one is the concrete barriers when the vehicle

colloid or have colleen, concrete barriers are only efficient around 23% and second one we have guard rail it's around 19% efficient then we have flowerpots and curb stones it's efficient around 15%, bridge wall it's efficient around 13% then overhead bridge/tunnel wall it's 13% efficient and lastly we have the tree barriers which efficient rate is very worst after colleen is 5% only. So in other side a rolling barriers is found to be efficient around 76.9% at average speed of 78.4 kmph and its efficient rate after Collison is very excellent than any traditional barrier I have mentioned above. [5]

Figure 1: Rolling Barriers at the U-turn

5. Features

1) Material is eco-friendly.
2) It reduces the speed of vehicle.
3) Reduces costs in repairing & maintenance due to Roller's resilience.
4) Easy to maintain due to separated barrels (recyclable).
5) Stopper boards installed on the top and the lower part of the barrels to guide objects back to the road.
6) Easy to adjust height, noticeable to drivers due to noticeable coloration and self-luminescence.
7) Noticeable to drivers due to noticeable coloration and self-luminescence. [4]

6. Advantage

1) Safety of the roads increased.
2) Maintenance is low.
3) Reduces the accidents on highway, expressways etc.
4) Useful in hilly reason, curved section or roads.
5) Easy to install.
6) Vehicles are prevented from colliding on obstacles by rolling barriers. [4]

7. Disadvantages

1) Availability of urethane resources is less.
2) Proper maintenance and inspection is required.
3) Requirement of labor for maintenance is more.
4) Heat treatment is required. [4]

8. Implementation

The efficient implementation of the rolling barrier will cater multiple objectives as discussed above, however RB can be applied resourcefully at following sites

1) National Highways and major roadways require its competent use.
2) Other accident prone sites like in curved road sections, U turns etc.
3) Gradients and slopes in the urban or state or national road arteries.
4) Inclines in parking lots and garages. [5]

9. Conclusion

Accidents are the error of the human's while using motor vehicles and also nature creates problems like rain causing slippery roads. Fog causing low visibility, etc. Ultimately life is more precious than vehicles but when it becomes to rolling Barrier system usage, it saves life and also reduces maximum damage to vehicles leading to saving of both financial as well as human resources.Rolling Barrier reduces the impact of collision, redirects the path of vehicle, convert impact energy into rotational energy. This reduces accidents and saves lives.

References

[1] International Research Journal of Modernization in Engineering Technology and Science Volume:02/Issue:11/November -2020 Impact Factor-5.354 www.irjmets.com
[2] IOSR Journal of Engineering (IOSRJEN) www.iosrjen.orgISSN (e): 2250-3021, ISSN (p): 2278-8719PP 09-10
[3] Many types of vehicles accident causes, like heavy truck, car etc. collected from https://www.vergesafetybarriers.com.au/road-safety-importance-bollards-barriers/
[4] Rolling Barrier Systems
[5] Mr. Dnyaneshwar J. Ghadge, Mr. Kamlesh B. Sangale, Mr. Shriyash R. Bhondve, Mr. Naresh M. Zende, Mr. Chankya H. Sahasrabuddhe
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