

Roller Barrier with Accident Detection System: Reduce Road Accidents, Increase the Safety and Reduce Effect on Economy: India

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Abstract— India is developing country so, India develop new infrastructures like roads, bridges etc. Moreover, highways and expressways will be built so, that number of vehicles can move on them which increases the chances of accidents and many of them lose their lives and effect on economy and GDP. So, to overcome this situation we can use roller barrier which is innovative concept by ETI (evolution in traffic innovation). IN this paper, Roller Barrier with accident detection system is recommended in India to reduce the probability of increases the safety and reduce the effect on economy. This roller barrier absorbs the shock energy and converts into the rotational energy which diverts vehicle back to their track. The accident detection system in roller barrier is used to send the basic information to the control room and first aid center to provide the first aid facility as soon as possible to the victim. So, we can apply effective system at high end curved roads, highways, hilly area, racing tracks.

Keywords: Accident detection system, Safety, Accidents, Economy, Roller Barrier, India, Roads, Infrastructure, Highways, Vehicles

I. INTRODUCTION

The road network of India is second largest road network in the world with total length of around 4,32,000 km and the construction of roads still increasing day by day. In India 23.24 crores of vehicles are registered till 2019 and road accidents in the country have increased marginally by 0.46% during 2018 with the year seeing 4.67 lakh road accidents and 1.51 lakh person died in 2018 as against 1.47 lakh in 2017. The number of 4.67 lakh accidents and 1.51 lakh deaths in 2018 which translates in an average of 1280 accidents and 415 deaths every day and nearly 53 accidents and 17 deaths every hour. Road traffic accidents are the leading cause of death among young people aged 15 to 29 year. So, it's direct and indirect effect on country's economy. Indian economy takes 3% hit every year due to road traffic accident which is over \$58,000 million in terms of value. Over a period of 24 years from 2014 to 2038, if India could have the deaths and injuries due to road traffic, its GDP could increase by 7%, a 2018 World Bank report said. Therefore, road safety is biggest issue to minimize the road accidents and increase the safety. So, we can use roller barrier with accident detection system which can reduce the speed of vehicles and prevent it from fatal accidents and inform to the nearest control room and first aid center.

II. FEATURES

- Easy to install.
- LED lights which are useful during night. (using solar energy)
- Roller barriers are made up hard rubber.
- Reduce the speed of vehicles.

- Absorb the shock energy and converts into the rotational energy.
- Accident detection system to inform the nearest control room and first aid center.

III. WORKING

Roller barrier is absorbing shock energy and subsequently converting that shock energy into rotational energy. The key of its effectiveness is the energy form an impact being absorbed and then deflected into the barrier and converted into rotational energy along the barrier. The ETI (Ethylene Vinyl Acetate) with excellent shock absorption power, three-dimension buffering frames and dense props supporting the frames. Rotating barrels comes with an attached reflective sheeting for good visibility. EVA has better flexibility and elasticity compared to other polyethylene resin and has almost similar than rubber and more elastic than urethane. In short, it's not easily damaged. when a car hits the guardrail, the rotating barrel converts shock form the vehicles to rotational energy. Upper and lower frames adjust tires of large and small vehicles to prevent the steering system from a functional loss. Roller absorbs initial collision shock, which converts to rotational energy. Front rails absorb second shock and back rails absorb third shock. Metal pipe inserted between the rails to strength then the post. Frictional rotating stopper boards installed to the top and bottom of the rollers act as clutch plates to decrease speed. Accident detection system is fixed on alternate roller barrier pole so we can detect the location of the vehicle where the accident has occurred and we can provide the first aid as early as possible, through this system we can detect accident in significantly less time and sends the basic information to first aid center and control room within a few seconds converting geographical coordinates, the time and angle in which a vehicle accident had occur. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module.

IV. ADVANTAGES

- Increase the road safety.
- Reduce the accidents.
- Redirects vehicles back into its lane which prevents driver and passenger fatalities.
- Easy to install.
- Accident detection system to provide immediate medication to accident victims.

V. DISADVANTAGES

- Maintenance cost is high.
- Time to time proper maintenance and inspection is required.

- Requires heat treatment.
- Material cost is high.

VI. CONCLUSION

India is developing country which leads to construction of new expressways, highways etc. In most of cases accidents has occurred due to inadvertency of drivers. Sometimes nature creates problems like raining and cold weather conditions due to which road surface become slippery so vehicle hit the barriers which are installed on the outer edge of roads. Road safety goes beyond the transportation sector, with a direct impact on public health, societies and economies. Human resource is the biggest resource and country is losing this precious resource but the nation too. So that rolling barrier with accident detection system through we can save the life of driver and passengers and also prevent the maximum damages of vehicles. So by increasing the safety, economy will also increase.

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