



VIRTUAL SPEEDBREAKER AND AUTONOMOUS VEHICLE COORDINATION FOR SAFER ROADS

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ABSTRACT

The findings in most recent accidents reveal that the main cause is due to the unscientific laying of road humps, poor visibility, bad condition of the roads and wrongly perceiving the impending spots by the vehicle driver which in turn results in huge damages to the vehicles and loss of precious lives. Although efforts have been made that were motivated by the transport authority not much of tangible results were noticed as of now. Hence an attempt is made to evolve, or a methodology which can alert the driver before the unfortunate obstacles to minimize the damages and loss of lives by using radio communication technology.

Our paper mainly concentrates on inculcating a safe sense of discipline and behaviour of the usage of roads and respecting traffic norms. Therefore, it is the need of the hour to alert drivers and ensure safety of our mankind.

Keywords- Road Humps, Poor Visibility, Transmitter & Receiver, Safety.

I. INTRODUCTION

Hitting a speed bump with slightly increased speed of vehicle frequently could cause serious damage to the car.

Coming to the deadliest highways of India which has some 726 black spots (a black spot is classified as a location on a national highway that witnesses more than 10 accidents a year) – there were 1,20,518 accidents on state highways while 1,42,268 on national highways in the year 2015, reports the Ministry of Road Transport and Highways Research Wing.

A. *Speed Bumps Can Destroy the Shocks Absorbers*

The car has shocks that absorb most of the road's imperfections. The car can also hit small dips without even noticing. That's because shocks have a coil shape that responds to changes in the road. Unfortunately, they can only absorb so much. Hitting a pothole makes the passenger jump because the shocks can't absorb such a quick dip. A similar thing happens when it runs over speed bumps. When it crosses them too quickly, your shocks simply can't absorb the energy that quickly, causing them to bend in unintended ways.

After the car runs over enough speed bumps, the shocks can start to shatter, leaving the car with little to no protection. Broken shocks also create a safety hazard. Without them, tires can actually leave the road when you come to a sudden stop. Once airborne, driver has no control over vehicle.

B. *Speed Bumps Can Destroy Steering Wheel*

When shocks go bad, the rest of car gets punished. The road's vibrations can negatively affect some of the car's most important systems. Steering is often the second thing to go. With no shocks for protection, the steering system gets shaken mercilessly during every trip. All of those crushing vibrations can:

- throw your wheels out of alignment
- break the steering rack mounts
- cause leaks in the power steering fluid reservoir

C. *Speed Bumps Can Destroy Exhaust System*

Today's exhaust systems make cars quieter and more efficient while reducing vehicle emissions. However, it's easy to damage an exhaust system when the car goes over a speed bump too fast. The exhaust system sits right



underneath the car. If the speed bump causes the car to jump off the road, even a small amount, could smack the exhaust system. If you live in a state that requires vehicle emissions tests, then you face an even bigger problem: you have to get the exhaust repaired just to keep driving your car.

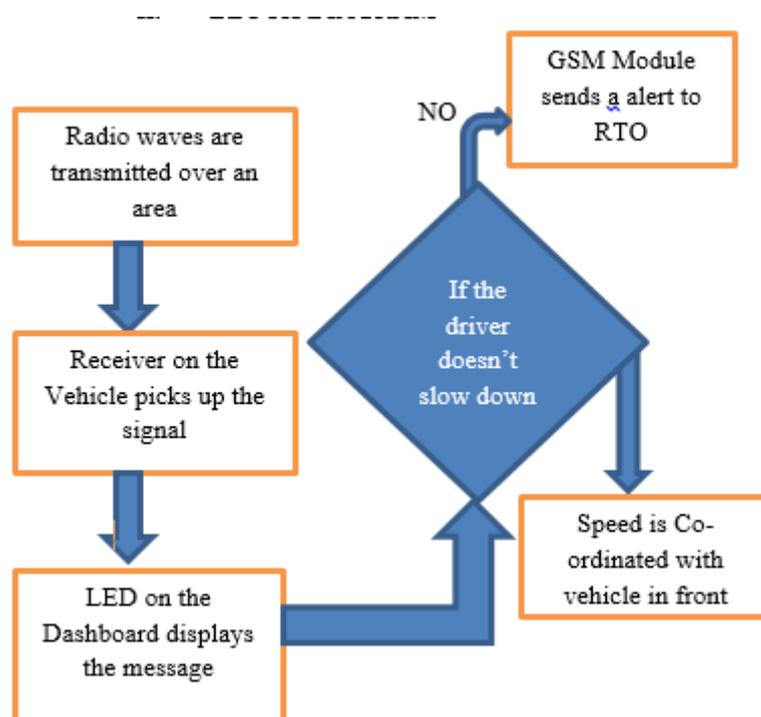
D. Speed Bumps Can Destroy Tires

Only the flat surface of the tires should touch the road. If the sidewalls touch, then they can quickly wear thin, which puts one step closer to a blowout. The impact of jumping a speed bump could force the sides of tires down far enough to scrape the ground. It's not the most expensive problem that happens from driving over speed bumps too quickly, but it can become a serious nuisance.

Basically, we will project radio signals from a distance above the traffic in an accident prone area. Radio is the technology of using radio waves to carry information.. The information in the waves can be extracted and transformed back into its original form. Radio systems also need an antenna to convert electric currents into radio waves, and radio waves into an electric current. An antenna can be used for both transmitting and receiving. A radio receiver receives its input from an antenna and converts it into a form that is usable for the consumer, such as sound, pictures, digital data, measurement values, navigational positions, etc. Radio frequencies occupy the range from a 3 kHz to 300 GHz.

A radio communication system requires a transmitter and a receiver, each having an antenna and appropriate [terminal equipment](#). In this case we would require a display to send the particular caution ahead message.

II. BLOCK DIAGRAM



III. METHODOLOGY

The proposed idea in this paper is to caution the drivers by using wireless radio communication and to send alerts about the upcoming situations of the roads further. The transmitters are installed on possible accident prone areas, intersections or curvy roads. These transmitters are supported by the existing street lights poles which can supply continuous power or a solar powered battery could be used. The relevant data is transmitted to the receivers in any vehicle that enters the braking region. Receivers are fitted on the vehicles to receive signals that are transmitted which is further linked to the LED display placed on the dashboard of vehicle. The receiver picks the data signal which is displayed with a following vibration in the steering wheel to caution the driver. The driver has to slow down below the safe speed limit otherwise every range of violation is counted, when certain limit is reached, the concerned jurisdictional RTO is automatically notified by using GSM module linked to the vehicle.



fig-1- LED Display on a dashboard of a car alerting the driver.

Speed coordination is also incorporated in the system to maintain safe distance between two vehicles using ultrasound. The ultrasound is fixed under the bonnet at three different angles to facilitate the functioning in curved roads and straight roads.

During night times, some cars turn on high beam lights that cause poor visibility to drivers in the opposite direction. Another transmitter is installed in the car which can be used to project signals to other cars with receivers to automatically switch to low beam light.

In case of breakage or removal of the receiver antenna on the vehicle, the engine can not be ignited so, by installing a small range transmitter which has to be linked to the receiver placed at the ignition of the engine. This way we can implement the permanent installation of the antenna.

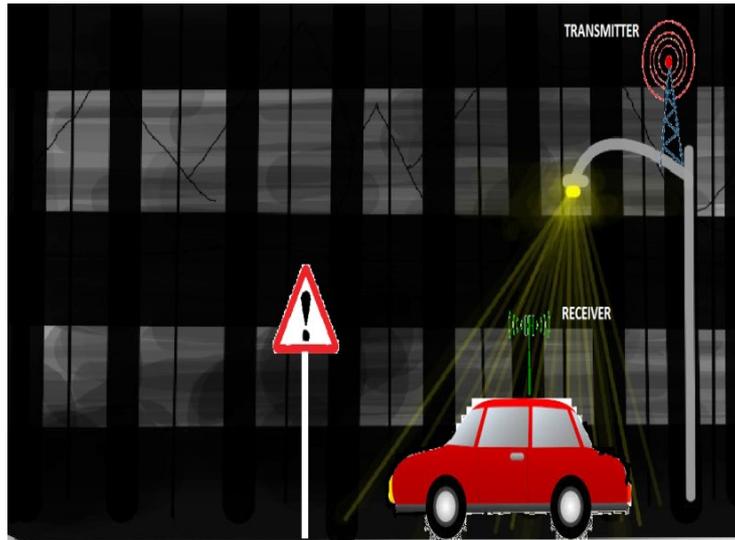


fig-2- the yellow light represents the radio waves that is transmitting data over an area.

IV. ADVANTAGES

- Lowers risk of accidents
- Alerts the driver before hand about upcoming situations
- Connected to RTO always by GSM system
- Suspension of vehicles, steering and exhaust system will not get spoilt
- Low cost
- Environmental Friendly

V. LIMITATIONS

- The radio waves might become slightly weaker during rainy season.
- Have to be installed in the already existing vehicles.

VI. FUTURE SCOPE

- This system can be efficiently used in the upcoming electric Hybrid Vehicles.
- Automatic slowing down of vehicles when it is required by incorporating it with ABS.
- We can incorporate Path-Planning.
- Better efficient Speed Coordination on heavily crowded roads.
- Can be used in futuristic driver-less cars for easier automation.

VII. CONCLUSIONS

In spite of the limitations, using this system can help all the drivers inculcate a safe and good sense of discipline. Drivers will be more cautious and road usage will be wise. It helps the citizens to follow traffic norms.

The main plus point is we can successfully eradicate the unscientific laying of humps . It leads to a better and safe travelling experience.

It is low cost and can be environmental friendly. As it uses the solar power, it is independent from uninterrupted power supply.

Speed Co-ordination is a huge added advantage too during heavy traffic hours. Driver need not judge the distance of the vehicle in front. There is no space for human error.

This system has a lot of scope in future. It can be developed on the same lines to make vehicular operations easier.

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