

# Application of Electromagnetic Field on Motor Vehicles for Enhanced Their Braking Capabilities

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**Abstract-**To reduce road accidents, a faster response and auxiliary braking system are playing an important role in part of the overall control of the vehicle. This paper describes how to control the speed and velocity of motor vehicles by constructing an electromagnetic road. This system provides better response to keeps the magnetic field of friction working longer and safer. It may help to reduce road accidents which are frequently occurring.

**Index Terms-** Electromagnetic field, auxiliary brakes, road accidents

## I. INTRODUCTION

The principle of braking in road vehicles involves the conversion of kinetic energy into heat. This high energy conversion demands a large rate of heat dissipation so that stable performance can be maintained (1). In general most of the vehicles are designed by using Ferro and Anti-Ferro magnetic materials so by construction of electromagnetic roads it is easy to control the vehicle at any speed. In this paper a new theoretical approach for construction of electromagnetic roads is proposed to describe different intensities of the magnetic field which are used to control speed of the vehicle. This method is better than the other methods described in the literature in a least square sense.

## II. GENERAL PRINCIPLE OF ELECTROMAGNETIC ROADS

The conventional friction road can absorb and convert enormous energy values, but only on the condition that the temperature of the friction contacts materials is controlled (1). In this case magnetic field arises due to electromagnetic induction property acted as mechanical energy which is decreases the kinetic energy of vehicles automatically. This generated mechanical energy acted on magnetic metallic alloys of the vehicles leads to control the different intensities

of magnetic field. In this phenomenon we insert various methods to explaining for generating different intensities of magnetic field avail to control the speed of vehicles.

## III. THEORITICAL METHODS OF ELECTROMAGNETIC ROADS:

Based on the direction of a magnetic field induction we describe the following methods to control the speed of vehicles. Those are

1. Horizontal flux method
2. Vertical flux method and
3. Tangential flux method

Horizontal flux method is applicable for parallel to an opposite direction of the passing vehicles which are having various dimensions. In this process the kinetic energy of vehicles is controlled by horizontal magnetic flux which is arises from the magnetic plates.

Vertical flux method is applicable for normal to a direction of the vehicles which are having various dimensions. In this process also static weight energy of the vehicle is controlled by the vertical magnetic flux which is arises from the magnetic plates.

Tangential flux method is applicable for tangential position to a direction of the vehicles which are having various dimensions. In this process the rotational kinetic energy of the vehicle is controlled by the tangential magnetic flux which is arises from the magnetic plates.

In general the ferromagnetic material, metallic alloys having different properties listed below due to these properties the vehicles are controlled by the applied magnetic flux of the magnetic roads.

- Permanent dipole moment
- High orientation order
- Very high susceptibility (Positive)
- B-H curve loss is very less

We are also using a mixing of Para magnetic material with ferromagnetic plates to control unwanted high intensity of magnetisation leads to heat effect during the demagnetisation process.

We should regularly verify the connections why because there may be a chance to produce heat energy due to eddy currents which leads to decreasing the intensity of magnetisation.

#### IV. CONCLUSION

By constructing electromagnetic roads we can easily control the speed of vehicles by producing required torque to braking system of vehicles.

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#### REFERENCE

- [1] [https://digitalscholarship.univ.edu/ece\\_fac\\_articles/82](https://digitalscholarship.univ.edu/ece_fac_articles/82) Modelling and control of Electromagnetic brakes for enhanced braking capabilities for automated Highway systems 391-396.
- [2] Retarder applications in commercial vehicles conference, London, 1974
- [3] IEEE Proceedings, Vol.138, July 1991, PP. 153-158
- [4] IEEE Proceedings Vol.121, No.2, Feb 1974, PP. 117-122
- [5] AIEE Transaction, Vol.61, 1942, PP.681-684